

# North American SEM Summit

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AUGUST 17, 2020

NORTH AMERICAN SEM COLLABORATIVE

Rename

Enter a new screen name:

OK Cancel

Participants (3)

- WG Wendy Gibson (Co-host, me)
- AW Andrew Whitlock (Host)
- AJ Anne Joiner

See your phone number? Merge me!

Invite Mute All

# NASEMC

Zoom Group Chat

**Andrew Whitlock:** Sending you words of wisdom

**Greg Baker:** Looking for your words of wisdom

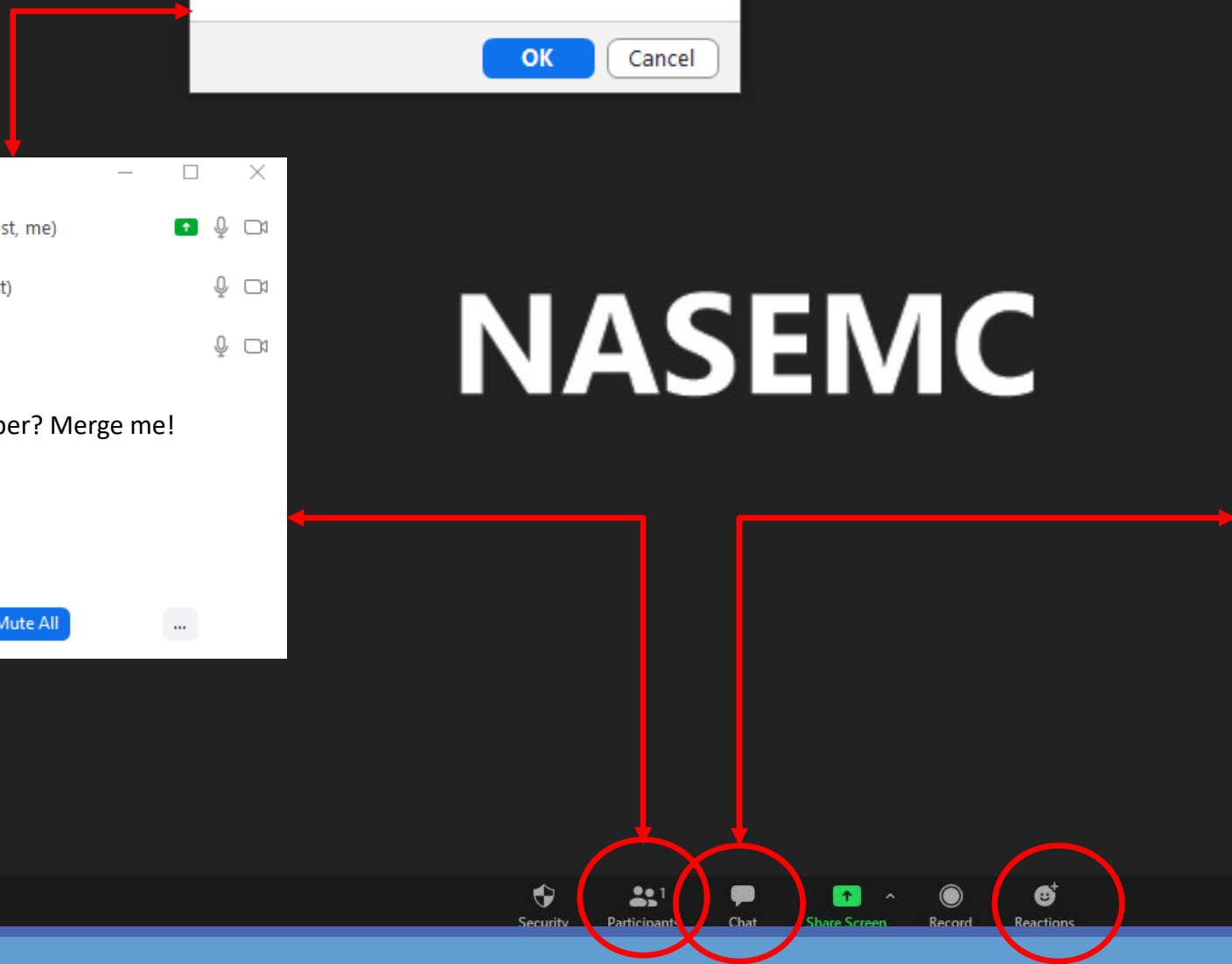
To: Everyone

Type message here...

Mute Start Video

Security Participant Chat Share Screen Record Reactions

End



# Thank You to our NASEMC Allies

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ADVANCED MANUFACTURING OFFICE

Thank You  
to Our  
Summit  
Sponsors

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Cascade**Energy**<sup>®</sup>

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# Team Work Makes the Dream Work



Zoom Queen

- Anne Joiner



Team Wrangler

- Andrew Whitlock



MentiMaster

- Chad Gilles



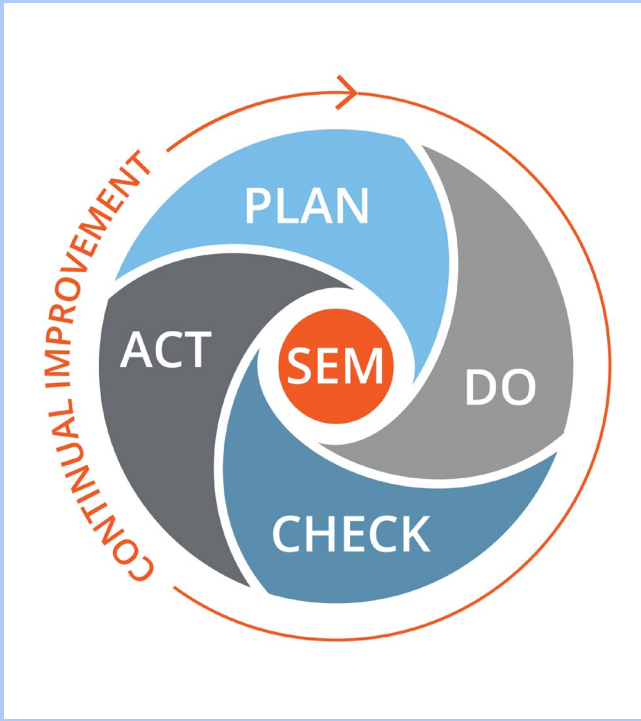
Hall Monitor

- Greg Baker



Worry Wort

- Wendy Gibson



Better Together

# Agenda

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- Welcome and introduction
- National support
- Helping you helping others
- More brains are better than one
- Participant insights: SEM for all!

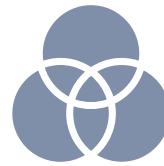
# Housekeeping



We will be recording  
the summit



Your opinion matters:  
Mentimeter



Let's make this  
interactive: Chat me up



Getting to know each  
other: Breakout groups



# Who's here?

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State your organization type (Program Admin, Consultant, Evaluator, NGO, Government, Participant)

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# NA SEM Collaborative Objectives

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Understand strategic priorities and needs of SEM stakeholders.



Create and convene a community of SEM practitioners to define and share best practices.



Be a mechanism for communicating the interests and perspectives of the SEM community in North America.



Support the expansion of existing infrastructure and resources to assist with SEM program uptake, measurement, and evaluation.

Persistence/Cost Effective



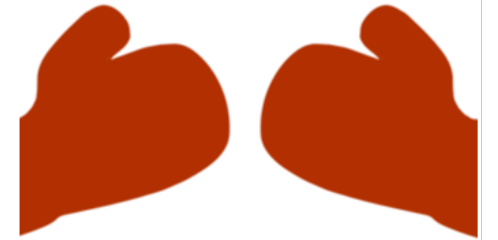
Program Integration



Negative Savings

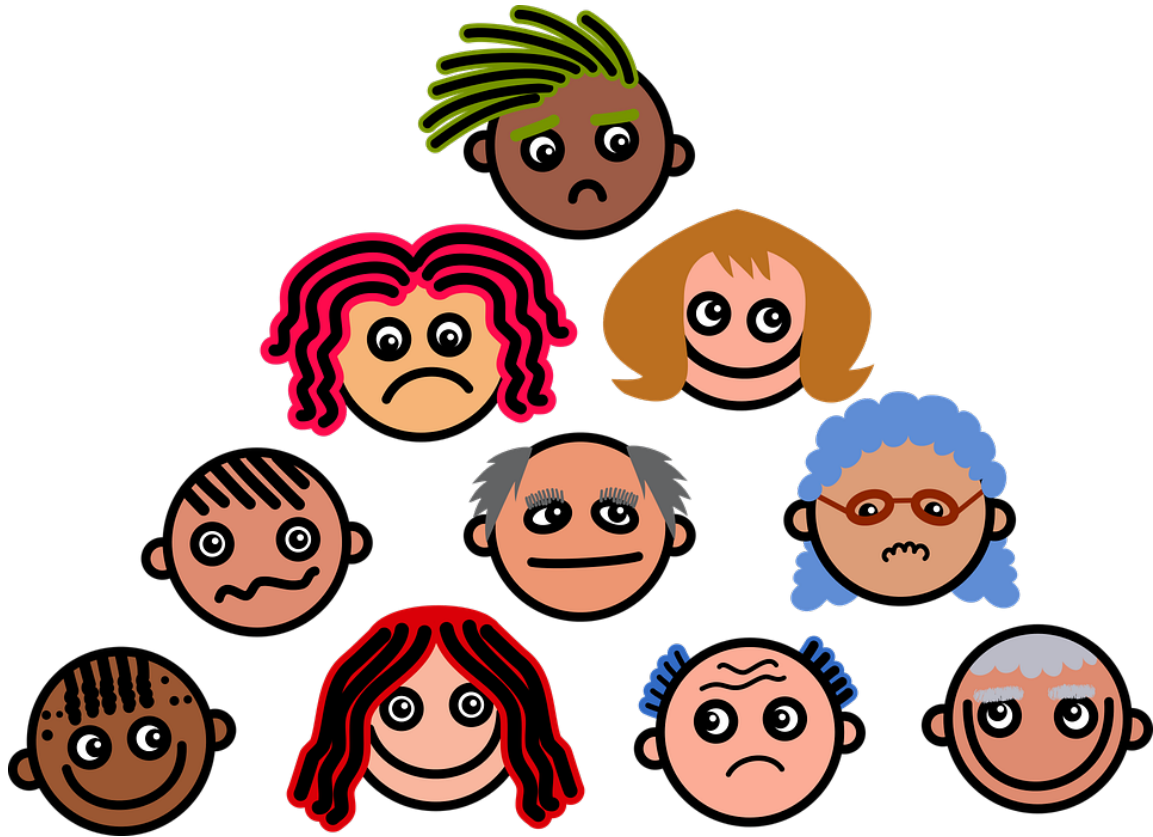


Action



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# 2019 SEM Summit



# Better Together

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Name

Company

What's the first thing you are going to do when things are back to "normal"?

What is your favorite SEM moment?

# What's one thing you learned about someone in your small group?

SEM is for gamblers

I learned about NMEC (?) and how there's overlap with SEM

Ready for concerts and high fives again!

Lots of folks brand new to SEM

Lots of great work happening!

Traveling is a much-missed activity

Kids off to college

The Danish govt has reps in CA.

Kids are challenging with Covid

She's trapped in Minnesota instead of her home in the UK because of covid

A lot of Kale!

We all miss the same things



# What's one thing you learned about someone in your small group?

that everyone wants to travel

XCEL Energy has an SEM pgm that is improving

Just got married

There are a lot of folks interested in 50001 Ready

No one is traveling in last 6 months

Community choice aggregators are adopting SEM

Someone is working out of a travel trailer in northern Michigan.

Want to go to concerts

Childhood dog had my same name

Ohio has a complicated SEM world

Hiking in the Redwoods



# What's one thing you learned about someone in your small group?

Everyone is looking forward to visiting family

You can make a faux background on your vido.

we all want to get out and see people again

Ohio has a complicated SEM world

movies!

We all miss traveling.

like to travelalso like live music

Hiking in the Redwoods

Patti is traveling to Greece once this is over!

People sure miss their grown kids

Some plants increased production in pandemic.



# What's one thing you learned about someone in your small group?

I learned Walt has been working on SEM for a long time - and people aren't treating him like he's crazy these days.

Kanchen had to postpone her wedding :(

Learning about a new publication on savings persistence on SEM after

Everyone wants to go to the movies.

State budgets are being affected by COVID.

ISO 50009

Public sector SEM going well

Looking forward to family visits

Missing live concerts and travel!

Big difference in university openings

that I knew everyone in the group





# What's one thing you learned about someone in your small group?

nearly a decade of an industrial program!

People want in-person meetings

Missing the music. We want LIVE music!

Community engagement via a school in Oklahoma

We can't wait to travel!

SEM for commercial clients

Zach P. has pig roasts !

Zoe - noted competitions between industrial cos on saving energy

Years of experience in SEM

That it's hard to define SEM.

People making new, "non-traditional" friends through SEM.

One young lady recently got married



# What's one thing you learned about someone in your small group?

That it's hard to define SEM.

People making new, "non-traditional" friends through SEM.

One young lady recently got married and is waiting for her honeymoon in New Zealand.

We are all missing the NORMAL 😊

There are dynamite people entering the field of SEM! Michelle Keller shared an example, and two young professionals in my group are tackling SEM in their studies and early career.

Need a way to hear more quickly from everyone

ladders are necessary

So happy to be learning about SEM

One of our group members trying to do SEM on a Covid budget!

Getting new participants into SEM is universally exciting/ a favorite part of



# What's one thing you learned about someone in your small group?

universally exciting/ a favorite part of this work

So happy to be learning about SEM

... do SEM on a Covid budget!

People are concerned about COVID

SoCAL Edison achieved 100% of target savings in thier first industrial cohort - Wing Hon

Extra time with kids

We all miss going out

David's MacArthur Genius Grant

customer experiences- lesson learned

SEM makes awesome impacts with the participants - The results are amazing to watch.



# What's one thing you learned about someone in your small group?

SEM makes awesome impacts with the participants - The results are amazing to watch.

Traveling is the first activity after the pandemic

Think about the small steps; they often can make big differences.





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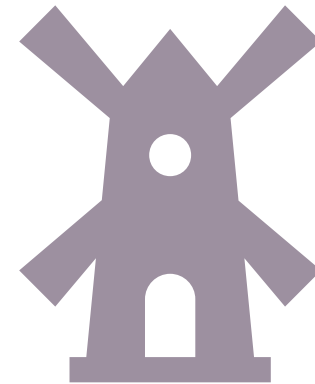
# National Support

# National Support

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Environmental Protection  
Agency  
– Walt Tunnessen



Department of Energy  
- Ethan Rogers



# ENERGY STAR Updates

2020 SEM Summit

Walt Tunnessen

US EPA

[Tunnessen.walt@epa.gov](mailto:Tunnessen.walt@epa.gov)





# Energy Treasure Hunt Campaign



**ENERGY STAR Treasure Hunts**

During an Energy Treasure Hunt, teams walk around a facility looking for quick ways to save energy. Those quick fixes can add up to big savings. Hundreds of organizations have used Energy Treasure Hunts to reduce their facilities' energy use by up to 15 percent. Are you and your crew ready to find the treasure buried within your facilities?

Home Resources Participants Submit Eligibility Video case studies

<b>4,300,000</b> Potential energy savings found (MMBtu)	<b>22.5</b> Potential cost savings (millions of dollars)	<b>229,000</b> Potential emissions avoided (metric tons CO2e)
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 <b>Name:</b> Amcor <b>Type:</b> Pharmaceutical, food, and home-care products packaging supplier <a href="#">More &gt;</a>	 <b>Name:</b> Colgate-Palmolive <b>Type:</b> Consumer products <b>Potential Savings:</b> 9.6%, 3.4%, 6.8%, 3.3%, 16.1%, 3.5% <a href="#">More &gt;</a>	 <b>Name:</b> Sherwood Case R-VIII School District <b>Type:</b> High School <a href="#">More &gt;</a>	 <b>Name:</b> Allergan <b>Type:</b> Pharmaceutical manufacturing company <b>Potential Savings:</b> 21%, 50% <a href="#">More &gt;</a>
 <b>Name:</b> Columbia Association <b>Type:</b> Property management organization <b>Potential Savings:</b> \$2,400 <a href="#">More &gt;</a>	 <b>Name:</b> The Boeing Company <b>Type:</b> Aircraft, satellite, and telecommunications manufacturing <b>Potential Savings:</b> 7.3%, 19.7%, 6.7%, 17.9% <a href="#">More &gt;</a>	 <b>Name:</b> Kilroy Realty Corporation <b>Type:</b> Real Estate Investment Trust <b>Potential Savings:</b> \$20,500 <a href="#">More &gt;</a>	 <b>Name:</b> Lockheed Martin <b>Type:</b> Aerospace, defense, and advanced technologies <b>Potential Savings:</b> 12%, 5%, 17%, 3%, 15%, 5% <a href="#">More &gt;</a>

**CERTIFICATE OF RECOGNITION**

presented to  
**Kilbourne Plant - Sample Industries**  
 Washington, DC

By the U.S. Environmental Protection Agency in recognition of their commitment to protecting the environment through improving energy efficiency by conducting an ENERGY STAR Treasure Hunt and identifying 50,000 kWh in potential annual energy savings.

December 15, 2019

Jean-Louis, Chief, ENERGY STAR Commercial and Industrial Branch

Date



# Treasure Hunt Resources



Energy Treasure Hunts During COVID-19

**The global COVID-19 pandemic creates new challenges and complications for energy programs planning energy treasure hunts.** Safety precautions that limit access to facilities and social distancing requirements limit the teambuilding and group interactions that make treasure hunts unique. Non-normal operating and production schedules create new complications as well. Yet some organizations are finding ways to adapt their treasure hunts by:

- Utilizing virtual meeting platforms to conduct preparation activities, training, the opening presentation, team meetings, and the report out presentation;
- Using smaller teams to investigate target areas, equipment, or systems;
- Taking advantage of closed facilities to look more closely at specific systems;
- Conducting deeper remote analysis of facility energy use data, when possible; and
- Overall coordination of onsite event and report out meetings.

This tip sheet draws on insights from companies that have adapted their new methods of conducting energy treasure hunts. Every energy program will need to assess what is possible given their organization's new safety requirements. For more information and resources on energy treasure hunts, please visit [www.energystar.gov/treasurehunt](http://www.energystar.gov/treasurehunt).

**1 Determine Virtualization Strategy**

Many of the phases and planning steps of the treasure hunt can be done remotely using virtual meeting platforms, as illustrated in the table below.

Phase	Step	Remotely	On-site
Preparation	Facility selection and scheduling	•	
	Identify and confirm team members	•	
	Data collection and analysis	•	
	Prepare detail sheets & calculators	•	
	Develop agenda and plan	•	
Pre-hunt training	Meet with team leaders	•	
	Train participants	•	
Treasure hunt event	Opening presentation	•	
	Go & see		•
Prioritize & follow-up	Team summaries / Detail sheet work	•	
	Create implementation plans	•	
	Check-ins / huddles	•	

Many organizations now have a preferred virtual meeting platform. It is important to understand the capabilities and limitations of the system. Additionally:

- Ensure all team members have access to, and are familiar with, your organization's virtual meeting platform
- Set up a file-sharing platform that can be accessed by all participants
- Use shorter but more frequent meetings to help keep members more engaged
- Make sure the treasure hunt facilitator has access or is invited to all team meetings and breakout sessions

VIEW HONDA'S 5-PART VIDEO SUCCESS STORY

Project Details

Community Short Title

Other

Originator(s):

Projected Situation (after Opportunity)

	Business Hours	Non-Business Hours
Equipment Name		
Running: Hours/Day		
Days/Month		
Months		
Set point		
Other		

Utility Use		
Electricity		KWh
Natural Gas		MMBtu
District Steam		MMBtu

[www.energystar.gov/TreasureHunt](http://www.energystar.gov/TreasureHunt)

# New Commercial Buildings Initiatives

- ▶ ENERGY STAR Tenant Space Recognition
  - Late October 2020
  - Initially for office space – plan to expand to other space types
  - Recognition application via Portfolio Manager
- ▶ Greenhouse Gas Calculator
  - Early 2021
  - Estimates past, current, and projected GHG emissions
  - Functionality to import data from Portfolio Manager & web services
  - Will allow for custom emission factors
- ▶ Benchmarking and Building Performance Standards Toolkit
  - Geared for state & local governments

[www.energystar.gov/buildings](http://www.energystar.gov/buildings)

# ENERGY STAR Certification

- EPA recognizes that Covid-19 can impact certification
- New guidance for commercial buildings
- Some flexibility granted
- Check Portfolio Manager for more guidance and updates



# Challenge for Industry Recognition

- Updated resources to support regression-based energy performance models used by SEM programs
- If you work with industrial customers, encourage them to take the Challenge!
- Challenge offers recognition to industrial plants that improve energy performance by 10% within 5 years or less



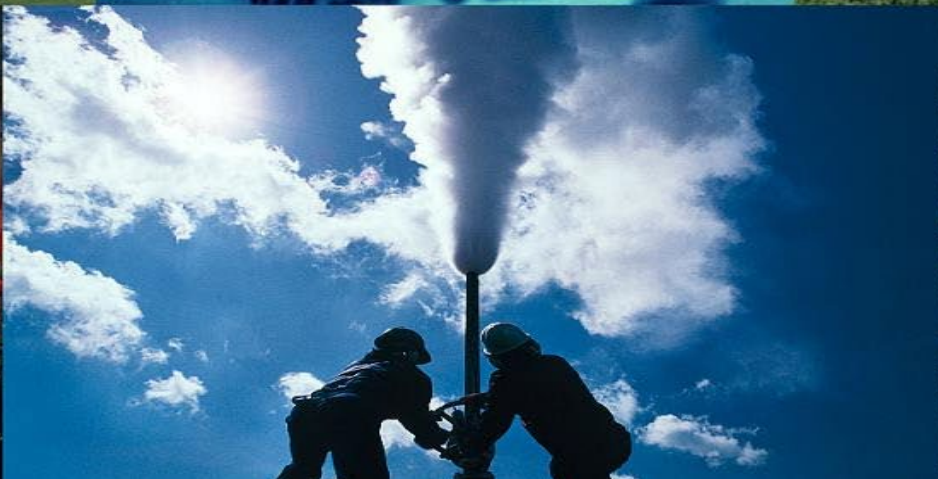
[www.energystar.gov/industrychallenge](http://www.energystar.gov/industrychallenge)



**50001 Ready**™

U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy



50001 Ready Program & Navigator Update  
2020 SEM Summit  
August 17<sup>th</sup>, 2020

U.S. Department of Energy  
Technical Partnerships  
Advanced Manufacturing Office

# DOE: How are you or other utilities leveraging the 50001 Ready program?

Not

Guide for tasks and resources

This is integrated into program work

Using as outreach engagement tool to recruit Cohort participants.

Don't know. Tell me more.

Offering it as an additional resource to our SEM cohort participants- which help them hit most of their major milestones as part of their participation in the OG&E Continuous Energy Improvement Program.

Not currently leveraging

Customers are starting to ask about 50001, so wondering how to serve them best.

As a stepping stone for SEM

Not

Not yet.



# DOE: How are you or other utilities leveraging the 50001 Ready program?

As a leave-beyond/engagement tool to provide resources to customers.

piloting it

N/A

we are not

a

Adhoc approach.

An opportunity for experienced SEM participants to take it to "the next level"

Some as a suggested resource, some as a requirement, some not at all

Don't know about it

Helping customers develop own energy management program



# DOE: How are you or other utilities leveraging the 50001 Ready program?

participants to take it to "the next level"

as a requirement, some not at all

Not yet

Not yet

We are delivering a training cohort for fed facilities

not a current user

Helping customers develop own energy management program.

To demonstrate the structured approach of SEM to senior

Helping Participants recognize through their participation in SEM 60-80% of their 50001 Recognition is already completed.

Not

Gap analysis and North Star

Added to SEM continuation





# DOE: How are you or other utilities leveraging the 50001 Ready program?

management

I want to learn more.

Not yet

Additional resource

...

...

Adding it as another resource to our SEM participants.

Training, training, training

Not really underway

...

...

Learning about it now.

Not yet

We are performing gap analysis for customers, assisting them to identify what they need to meet the requirements

# DOE: How are you or other utilities leveraging the 50001 Ready program?

Additional resource

Not really underway

customers, assisting them to identify what they need to meet the requirements

partner platform and supporting SEM participants who are interested in 50001 Ready

Providing planning support and serving as a resource

I know of it but don't know much about how to use it

Introducing it to new 2020 cohorts.

Pointing customers to the self direct Navigator

we are not

We managed pilot that involved five companies in the NW beginning

Engaging Federal facilities in DC in a 50001 Ready cohort engagement through the DCSEU



# DOE: How are you or other utilities leveraging the 50001 Ready program?

we are not

Using it as the backbone of a self-serve/non-cohort program

Implementing 50001 Ready into a number of cohorts including with 14 large energy users in Canada (power plants, refineries, etc)

We managed pilot that involved five companies in the NW beginning 50001 Ready in 2019. Haven't heard of others using it since then, but could very well be happening.

Still trying to align 50001 Ready with utility program goals.

Not yet: early discussions

50001 Ready cohort engagement through the DCSEU

Next step or complimentary activity for sites in SEM engagements.

Would like to see this guidebook

Promoting it to SEM participants



# DOE: How are you or other utilities leveraging the 50001 Ready program?

serve non-cohort program

Implementing 50001 Ready into a number of cohorts including with 14 large energy users in Canada (power plants, refineries, etc)

thinking about leveraging it. It apparently needs to be adapted for Canada.

Still trying to align 50001 Ready with utility program goals.

Not yet; early discussions

I have not

Would like to see this guidebook

Promoting it to SEM participants

Support school RCMs to work with students more



# DOE: Please describe features the 50001 Ready Partner Platform has that are valuable to utility programs?

no cost

Sharing information with others

Template documents, like energy plan and engagement ideas.

Organize and view customer progress into cohorts

playbook

Customer engagement and relationship management

The online tool is awesome! Easy to navigate, and full of wonderful resources.

Sharing

Implementation progress tracking dashboard

Not the 14 character password required to login.



# DOE: Please describe features the 50001 Ready Partner Platform has that are valuable to utility programs?

Examples of documents?

web based navigator

free!

Don't know

The platform can be branded with utility or program brands

Great collaboration with the team responsible for 50001 Ready

Tracking of completed phases/tasks

not familiar with this platform

online dashboard at site and portfolio level

Rolling it out to the whole organization

?

Allows the program implementer to help over see the progress of the



# DOE: Please describe features the 50001 Ready Partner Platform has that are valuable to utility programs?

Supports customers who may not be eligible for a typical SEM (large C&I)

The step by step tasks seem to be very helpful

case studies

Case studies

more outreach

help oversee the progress of the customer.

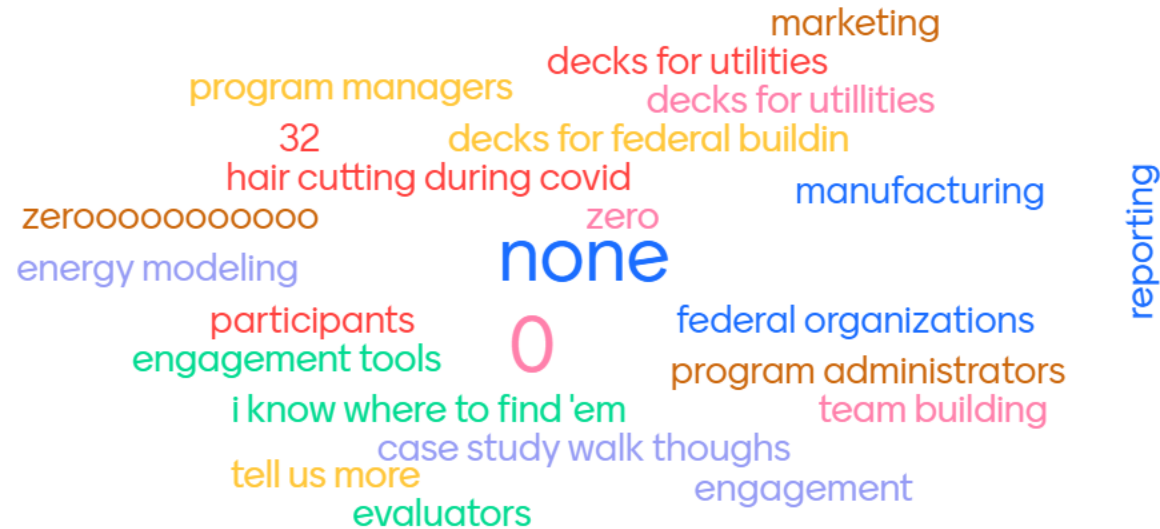
Not a utility. Have not heard about this from our utility or Industrial SEM contractor (ESI).

Training with examples

continuing to listen and learn from others

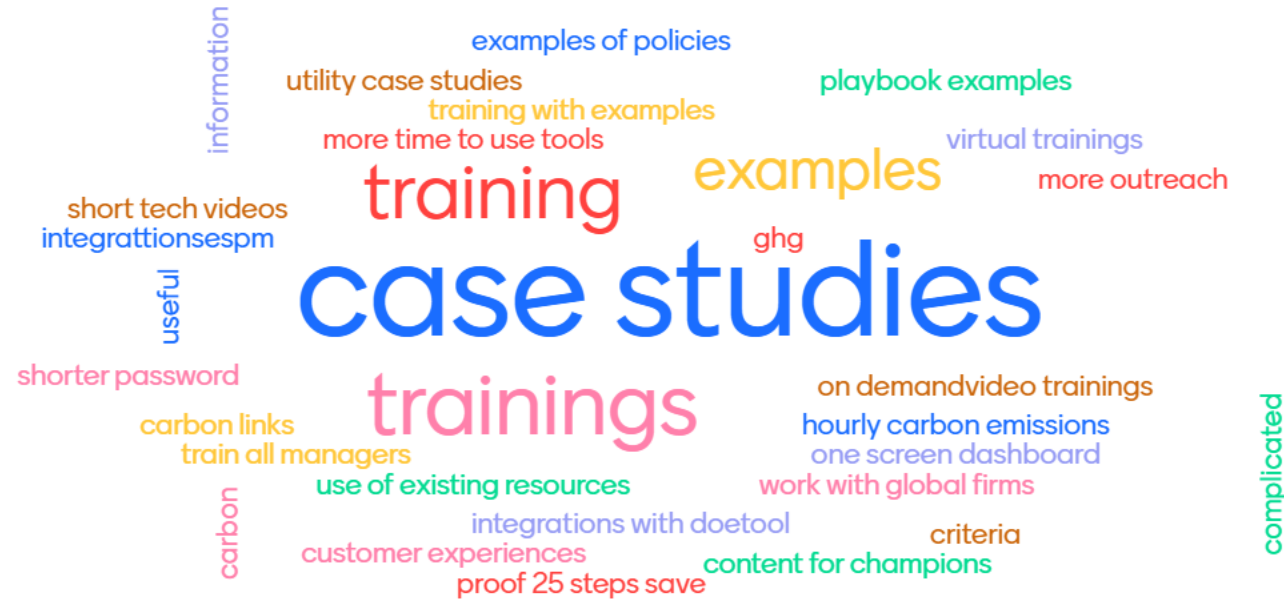


DOE: In the last DOE utility sector webinar, we discussed almost a dozen training slide deck resources. How many of these can you name?






# DOE: What would be valuable to you (resources, trainings, webinars) from DOE?




A stylized illustration on a dark grey background. Three human figures in teal, purple, and olive green are reaching upwards towards a tree with green leaves and red fruit. The teal figure is on the left, the purple figure is in the center, and the olive green figure is on the right. The purple and olive green figures are standing on brown rectangular blocks. The text 'Moving Forward Together' is centered in white, with a thin white horizontal line underneath it.


# Moving Forward Together



What more could be done to include DEI in SEM Work?



How can we leverage SEM to create more meaningful and impactful professional growth for minorities and women?

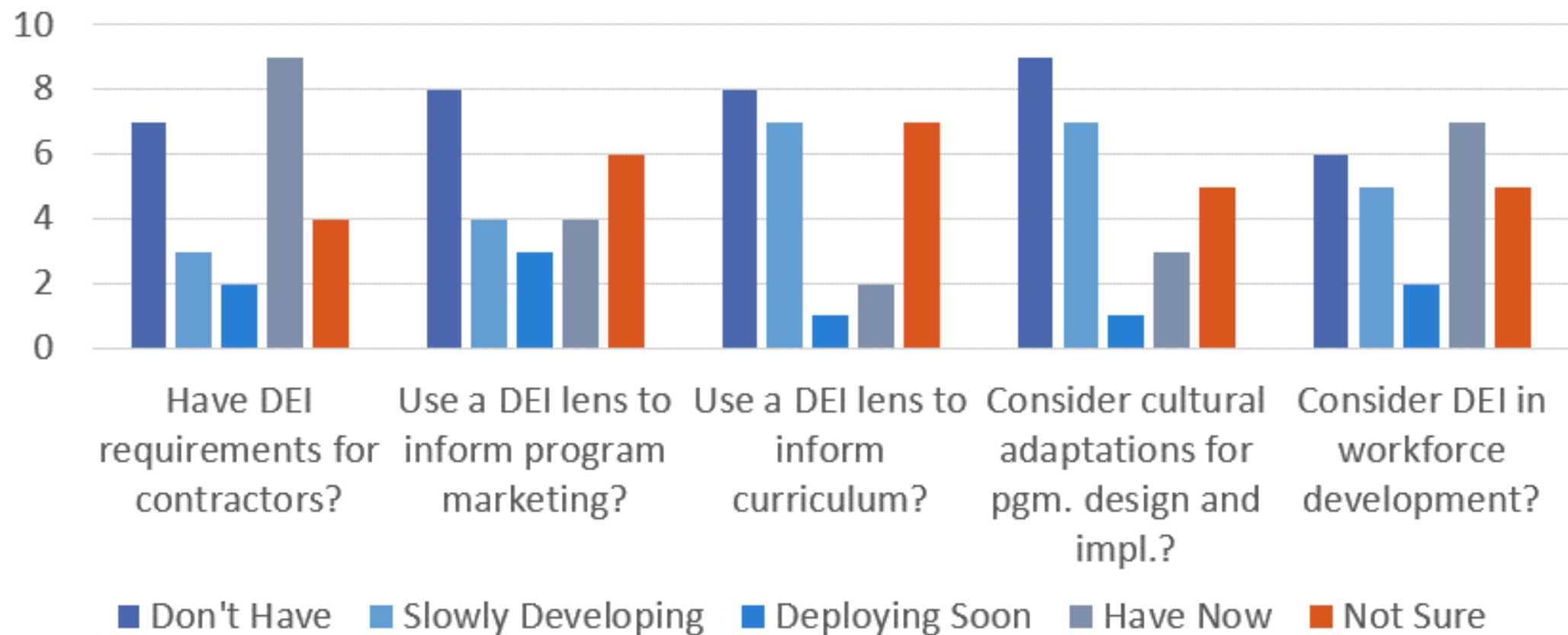


Cohorts targeting environmental justice areas to improve the overall facility energy performance and support the community.

# Helping You Helping Others

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# Pre-Survey: Does your organization/client have SEM programs that do the following:



Go to [www.menti.com](http://www.menti.com) and use the code 86 24 85 6

# DEI: What do you feel is your next step?



# OG&E Schools Cohort

PATRICK CURRY, CLEARRESULT

MIKE ROE, FORT GIBSON PUBLIC SCHOOLS

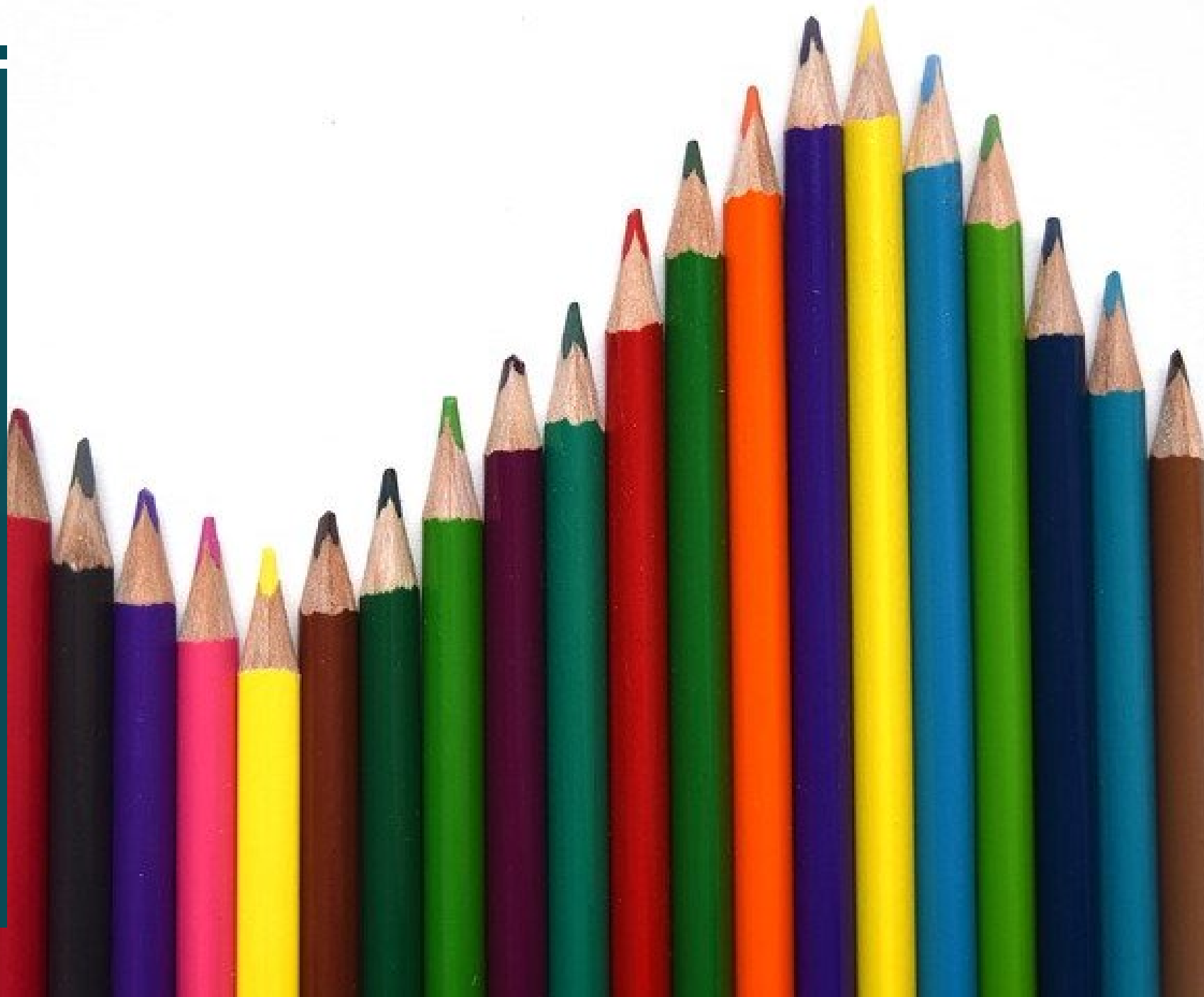
GEORGE KUNSMAN, FORT GIBSON PUBLIC SCHOOLS

DALLAS LANDERS, FORT GIBSON PUBLIC SCHOOLS

# SEM High School Internship Program

- BRIDGING THE GAP IN  
STEM

© CLEARRESULT 2020





# Our Mission

- Objectives:
  - Provide Educational Enrichment
  - Create Professional Development Opportunities
  - Expand Access to more Students
  - Encourage Underrepresented Students to get Involved







# Questions





What are your next steps?

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Have  
a  
Break



# SEM M&V

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# COVID Impacts to SEM

ANDREW BERNATH, ROUJ ENERGY ANALYTICS

# THE IMPACT OF COVID-19 ON SEM SAVINGS ESTIMATION

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**Presenter:** Andrew Bernath, Rouj Energy Analytics

**A collaboration by:**

Andrew Bernath, Rouj Energy Analytics ([andrew.bernath@roujenergy.com](mailto:andrew.bernath@roujenergy.com))

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# TABLE OF CONTENTS

## ROADMAP TO A NEW FRONTIER

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1. The Challenge: What are we up against?
2. Methodology: What tools are available?
3. Savings Estimation: Can we rewrite the instruction manual?
4. Conclusion: How do we put it all together?





# THE CHALLENGE

## DEFINING THE PROGRAM

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First, let's **zoom out** and see what we want

What is **Strategic Energy Management**?

- Energy savings **education** and **behavioral coaching**
- Uses **past behavior** and **billing data** comparisons to estimate savings
- **Meter based** program considers **whole-facility** energy usage



# THE CHALLENGE

## ENTER COVID-19

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COVID-19 is **changing the landscape** of SEM savings estimation

Since SEM programs use **meter level data** to calculate savings, the **unrelated impacts** from COVID-19 may masquerade as “savings”

- Sectors may be impacted **disproportionately**
- Impacts may also vary at the **business type** and **individual facility** levels
- **Accounting for** these impacts requires a **Non-Routine Event (NRE)** adjustment

We **know** that customers **have been impacted** by COVID-19

Now we **must consider** how we can **account for** this using NRE adjustments

# METHODOLOGY

## ADJUSTING METHODS

---

### Our goal:

Develop a **defensible method** to estimate savings attributed to SEM **program activity**

Under **ideal circumstances** the previous techniques are sufficient

We require **alternative methods** when:

- We cannot **accurately develop** an estimate of baseline consumption
- A **disruption** in energy usage occurs **after** program implementation

# METHODOLOGY

## MODELING FRAMEWORKS

---

Two statistical modeling frameworks:

### 1. Forecast

- a. **Most commonly** used in SEM evaluation
- b. Model is specified using **baseline** energy consumption data
- c. **Energy consumption** in the baseline and post-implementation periods are **compared**
- d. Can **model NRE's** occurring in the **baseline** period
- e. This model is **unreliable** when NRE's occur in the **post** period

### 2. Pre-Post

- a. Model is specified using **all available** energy consumption data
- b. Uses an **indicator** to identify the post-implementation period
- c. **Coefficient** of the indicator is an estimate of the **per-period savings**
- d. Indicator can be **interacted** with other variables to **account for** combined effects
- e. Can typically **model NRE's** occurring in **both** the baseline and post periods



# METHODOLOGY

## MODELING FRAMEWORKS

---

Two statistical modeling frameworks:

### 1. Forecast

- a. **Most commonly** used in SEM evaluation
- b. Model is specified using **baseline** energy consumption data
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- d. Indicator can be **interacted** with other variables to **account for** combined effects
- e. Can typically **model NRE's** occurring in **both** the baseline and post periods



# SAVINGS ESTIMATION

## HANDLING NRE'S

---

### 1) Short Term Changes Removed:

- a) Disruption occurs for a **set period** of time in the **post-period**
- b) Disruption **period is short** relative to measurement period
- c) After disruption, facility operation “went **back to normal**”

### 2) Post-Installation Modeling:

- a) Disruption occurs in the **post-period**
- b) Disruption **period is longer** than a few measurement periods or **occurs at random** intervals
- c) Disruption has a **strong impact** on site usage

### 3) Engineering Model:

- a) Disruption affects **specific equipment or operations** for a set period
- b) The **magnitude** of the disruption is **not large** relative to the savings estimates
- c) Energy usage **estimates are available** for the affected equipment or operations



# SAVINGS ESTIMATION

## HANDLING NRE'S

---

### 1) Short Term Changes Removed:

- a) Remove the period that includes the disruption and **re-annualize the savings** estimate
- b) **Seasonality** should be considered but if the **change was brief** this is the simplest way to account for short term changes

### 2) Post Installation Modeling:

- a) Model the disruption using an **indicator variable** in a pre-post model
- b) The indicator variable will often be a **statistically significant** variable
- c) The **impact of the indicator** variable can then be isolated and estimated

### 3) Engineering Model:

- a) Use **engineering estimates** of the equipment or operations to **directly remove** the estimated energy impact from the model results
- b) This may require **detailed understanding** of site equipment and operations

# SAVINGS ESTIMATION CONSIDERATIONS

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## 1) Short Term Changes Removed:

- a) If the facility has **strong seasonality** in energy usage, re-annualized savings may **not be accurate**
- b) If the disruption lasts longer than a **few observation periods** this method is not appropriate

## 2) Post Installation Modeling:

- a) The disruption should last for **more than a few** observation periods, or the statistical model might not estimate **significant impacts**
- b) This method is not appropriate when the disruption occurs **at or near program implementation**

## 3) Engineering Model:

- a) If the disruption has a **large effect** on usage, removing energy impacts from engineering estimates may result in **zero or negative savings** estimates
- b) This method is only appropriate if **established estimates** for the specific equipment or operations are **available**



# CONCLUSION

## WHAT SHOULD YOU DO?

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Our **proposed approach** to account for impacts due to COVID-19:

1. **Understand** what is driving site usage at the **customer level**
2. Assess risks from COVID-19 on energy usage at **each site**
3. Identify the **appropriate methods** to account for COVID-19's impact on energy usage
4. **Isolate** the identified impacts
5. Ensure SEM **savings align with activities** occurring at the site

Remember to **seek engagement** with implementation, evaluation, and site energy management team **as early as possible**, if you have questions

# FEEL FREE TO REACH OUT; WE LOVE NERDY CHATS:

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# Funded Research

PETER THERKELSEN, LBNL



# Funded Research Project

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NORTH AMERICAN SEM COLLABORATIVE RESEARCH TEAM

LBL - PETER THERKELSEN PH.D, HEIDI FUCHS AND BILL MILLER PH.D

ACEEE - ED RIGHTOR PH.D AND ANDREW WHITLOCK



# NASEMC Research Purpose



Accelerate	Accelerate SEM adoption & enhance effectiveness.
Improve	Improve estimation of impacts of future program offerings.
Inform	Inform SEM practitioners, program administrators, and regulators with performance-based information.
Answer	Answer key questions raised by the SEM community



# Research Approach - Cost Effectiveness and Persistence

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- Assemble SEM evaluations and program descriptions.
- Assess SEM program terminology.
- Interview program administrators.
- Identify links between program design structures and effectiveness.



# Step 1: Information Gathering

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## Define SEM for research purposes

- Any program self-identified as SEM

## Collect and Review Reports

- Program evaluations are released sporadically
- Some programs are in-progress or recently completed
- SEM may be evaluated as part of a larger program



# Menti-meter Question #1

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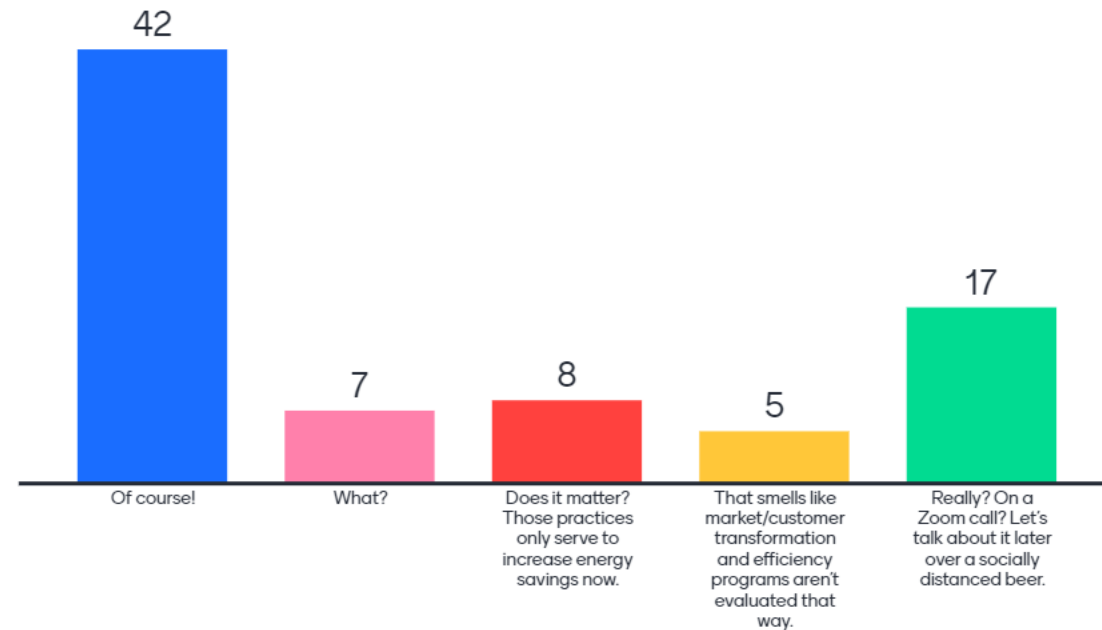
Are cost-effectiveness and energy savings persistence a function of the maturity of energy management business practices fostered by an SEM program?

1. Of course!
2. What?
3. Does it matter? Those practices only serve to increase energy savings now.
4. That smells like market/customer transformation and efficiency programs aren't evaluated that way.
5. Really? On a Zoom call? Let's talk about it later over a socially distanced beer.



Go to [www.menti.com](http://www.menti.com) and use the code 86 24 85 6

# Are cost-effectiveness and energy savings persistence a function of the maturity of energy management business practices fostered by an SEM program?



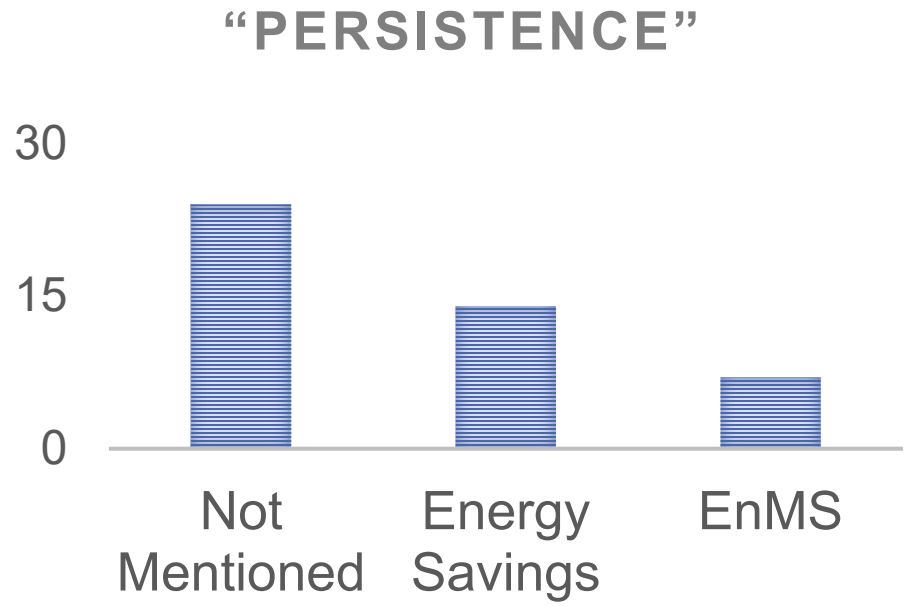
Exit presentation (ESC)

Navigation controls for the presentation, including icons for Exit, Minimize, Hide results, Close voting, Start countdown, and navigation arrows.





# Step 1: Report Findings



## Persistence:

- Persistence seldom discussed.
  - When discussed, a focus on savings persistence.
  - Few focused on energy management systems.
- Evaluations that stated savings persistence had an expected useful life of between 1-10 years.

## Cost-effectiveness:

Various cost-effective tests vary and are often determined by PUC, DEQs, or similar agencies.



# Step 2: Interview Topics

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## Overall Design

- Goal/Objectives
- Duration
- Approach
- Relation to other programs
- Incentives
- Support for EMIS

## Energy Savings

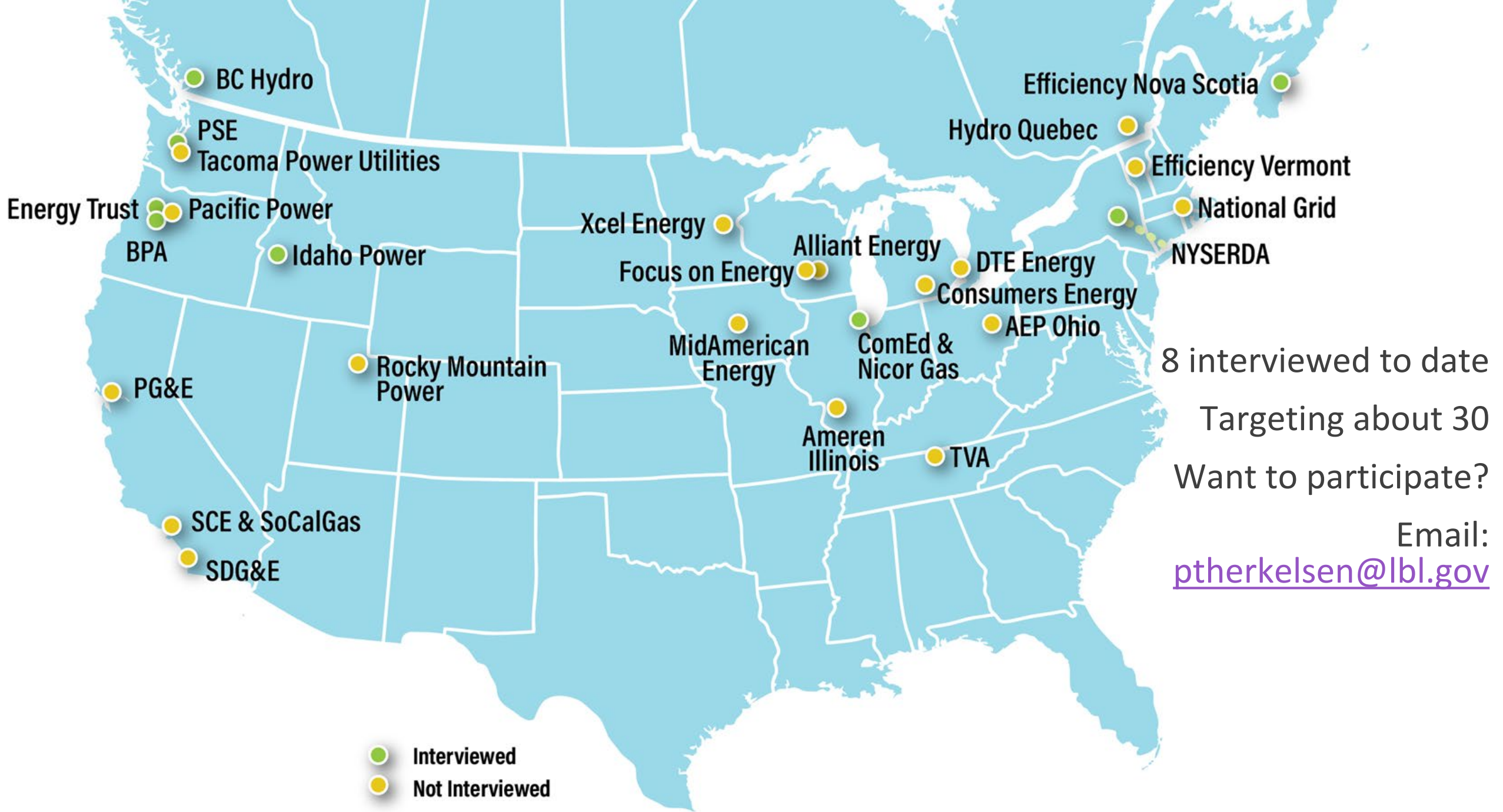
- Method
- Levels achieved
- Approach
- History of persistence

## Cost-effectiveness

- Test type
- Authority
- Projected vs achieved

## Management Practices

- Foundation
- How assesses
- Consideration of persistence



8 interviewed to date  
Targeting about 30  
Want to participate?

Email:  
[ptherkelsen@lbl.gov](mailto:ptherkelsen@lbl.gov)



# Interview Observations: Diversity

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Program design & support

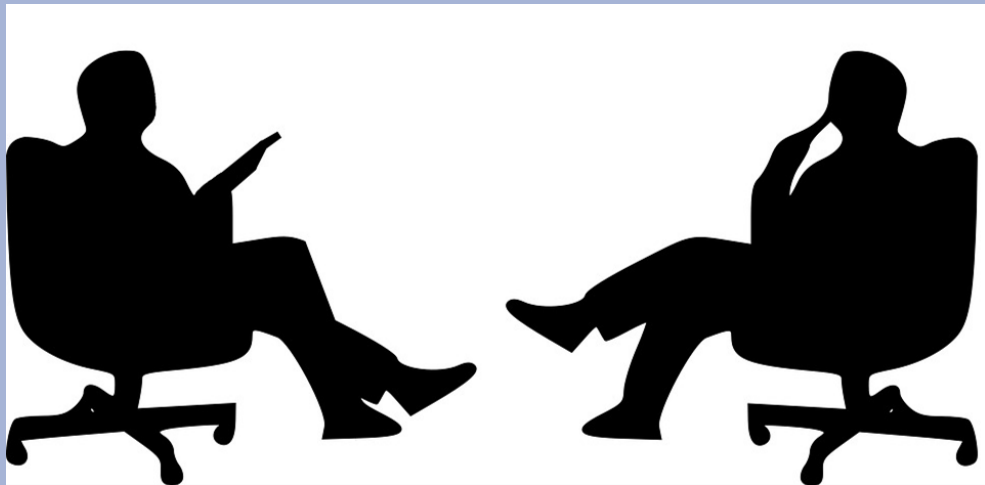
Energy management framework

EUL selection

Persistence evaluation of participants' energy management activities

How cost effectiveness is evaluated







## Menti-meter Question #2

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Brainstorm: What approaches should be taken to get these results in front of regulators and other stakeholders?

# Thank you!

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## Within the framework of SEM:

- How would research be useful to additional audiences?
- Who else should we interview?
- What are we not asking?
- What research areas would be good next steps?

Email: [ptherkelsen@lbl.gov](mailto:ptherkelsen@lbl.gov)



# Negative Savings

DUSTIN BAILEY, GUIDEHOUSE

# North American SEM Collaborative's Negative Savings Focus Group Results

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## **Presented by**

Dustin Bailey ([dustin.bailey@guidehouse.com](mailto:dustin.bailey@guidehouse.com))

## **Group Lead**

Greg Baker ([gbaker@veic.org](mailto:gbaker@veic.org))

## **Participants**

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Maggie Buffum ([Maggie.Buffum@cadmusgroup.com](mailto:Maggie.Buffum@cadmusgroup.com))

Jennifer Hockett ([Jennifer.hockett@cadmusgroup.com](mailto:Jennifer.hockett@cadmusgroup.com))

Dustin Schneider ([Dustin.Schneider@leidos.com](mailto:Dustin.Schneider@leidos.com))

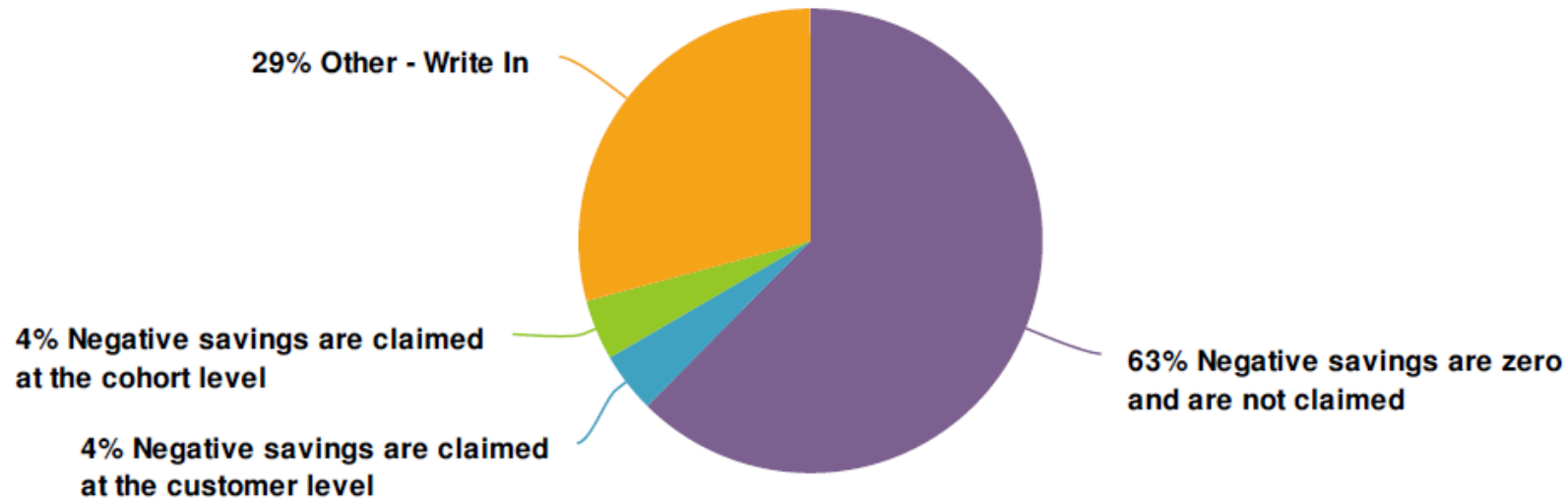
Alexander J. Dodd ([ALEXANDER.J.DODD@leidos.com](mailto:ALEXANDER.J.DODD@leidos.com))

## How does your program **account for negative SEM savings**?

We completed an interview with **24 program administrators and implementers** (from 14 states) to understand how negative savings is normally handled. Our results were **fairly split** with **some zeroing out the savings**, and others accounting for the **negative savings at the customer or program level**.

Additional highlights from the survey:

- Only 3 of the customers handled year two savings differently than year one
- **Measure life** varied greatly from **1 to 10 years**



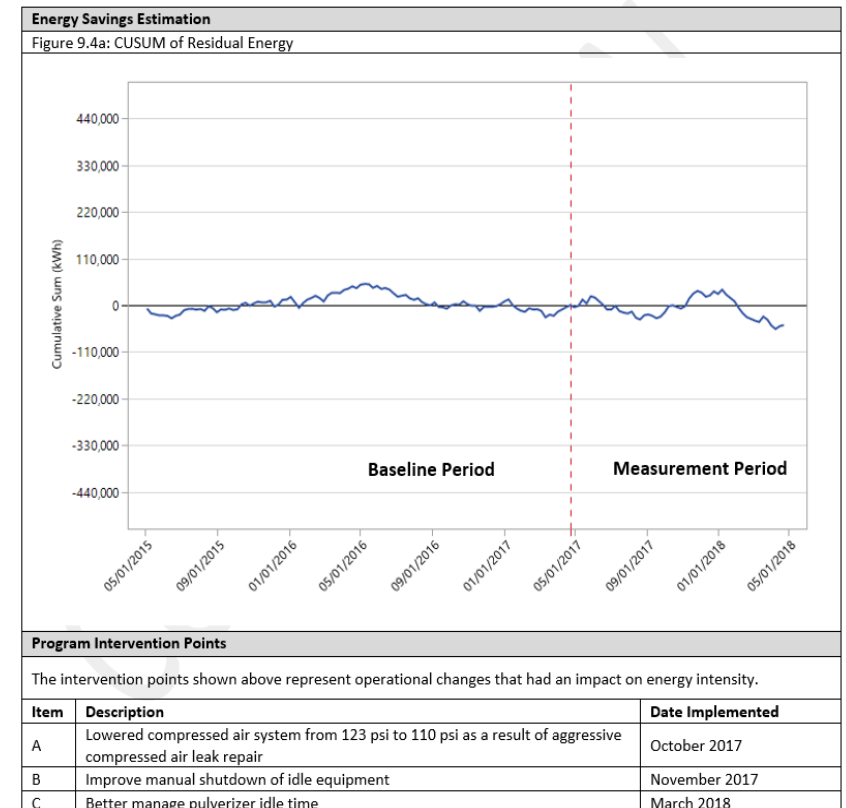
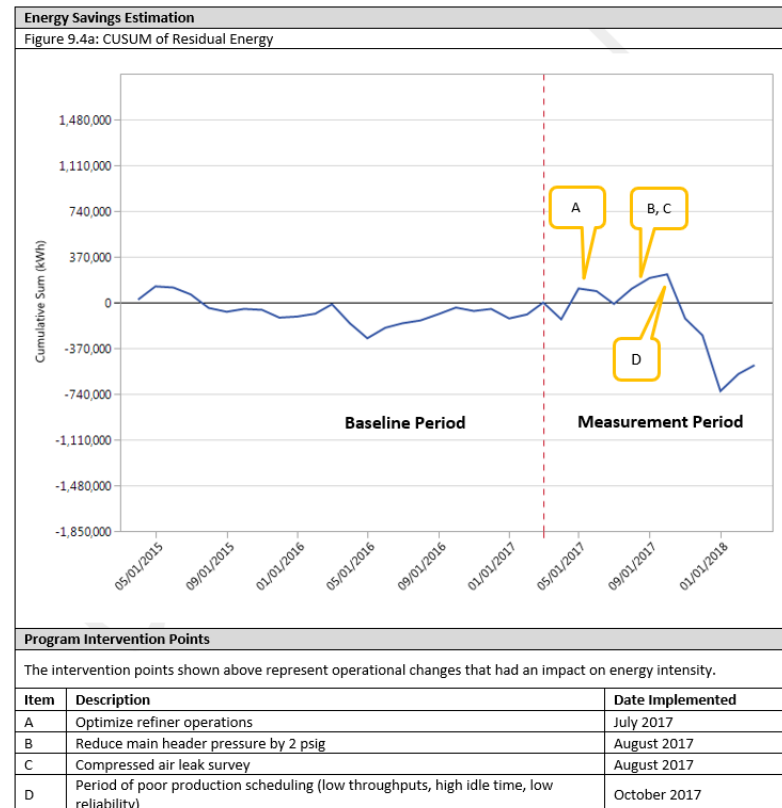
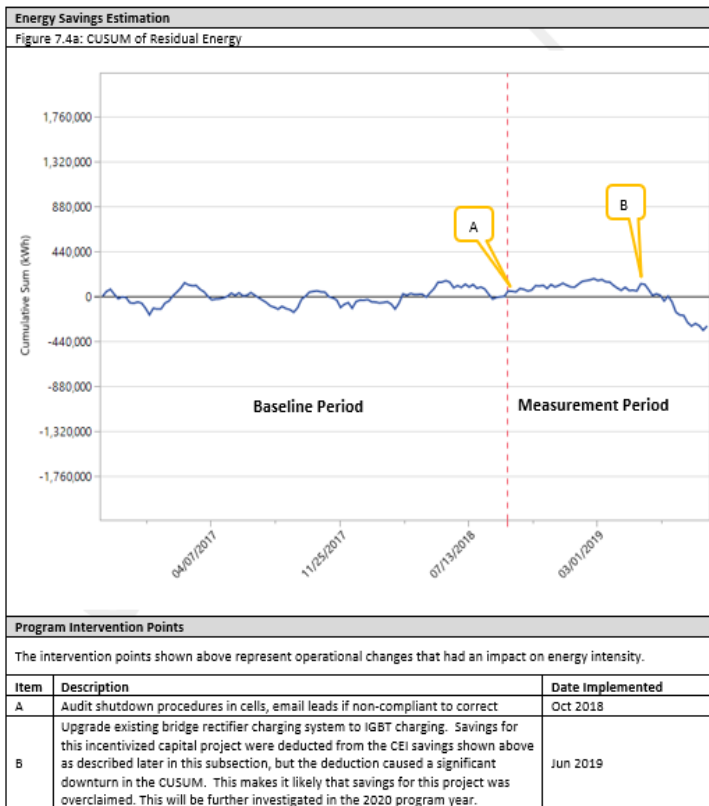
# Problem statement

Historical data suggest that SEM participation rarely causes an increase in facility energy intensity. However, when non-routine events are not identified nor accurately captured, the energy model shows an increase in energy use. Utilities and implementers report this information in inconsistent ways (sometimes zeroing them out and sometimes including the negative savings at the customer or portfolio level).

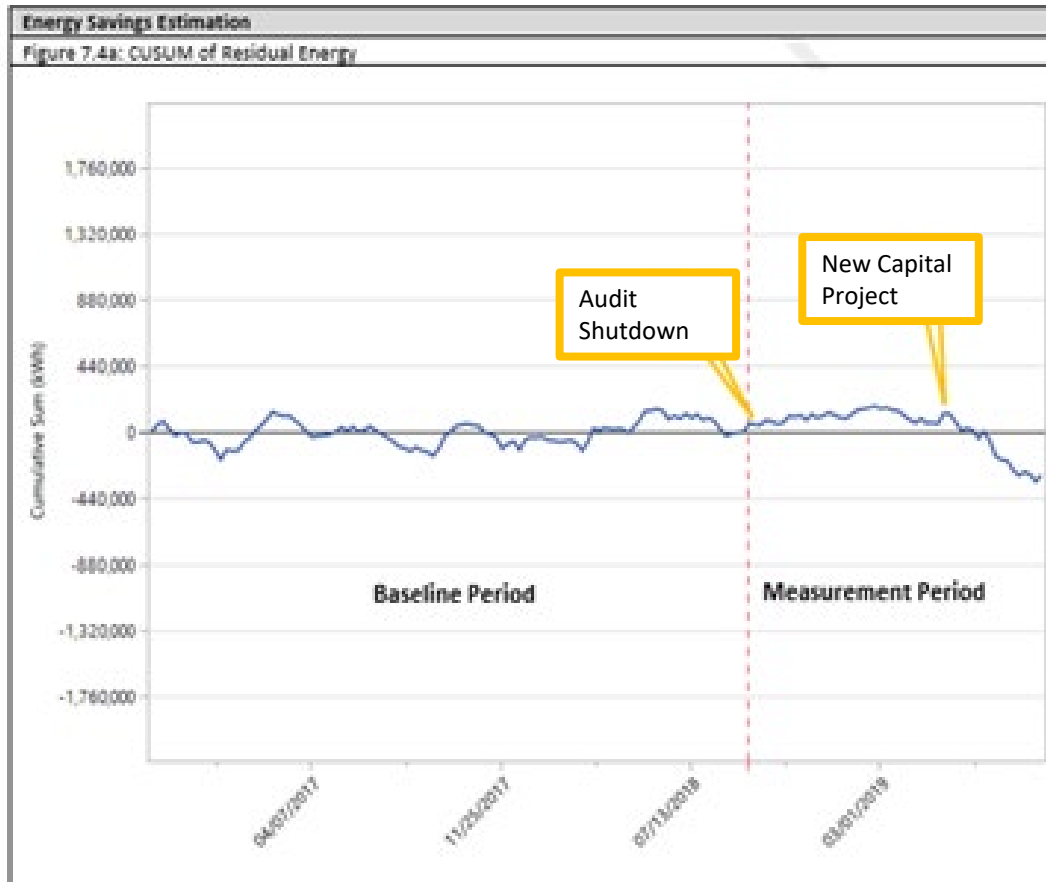
## Impact of Non SEM measures

## Process/Operation changes

## Behavior same as base- Non Engage



# Impact of Non-SEM measures



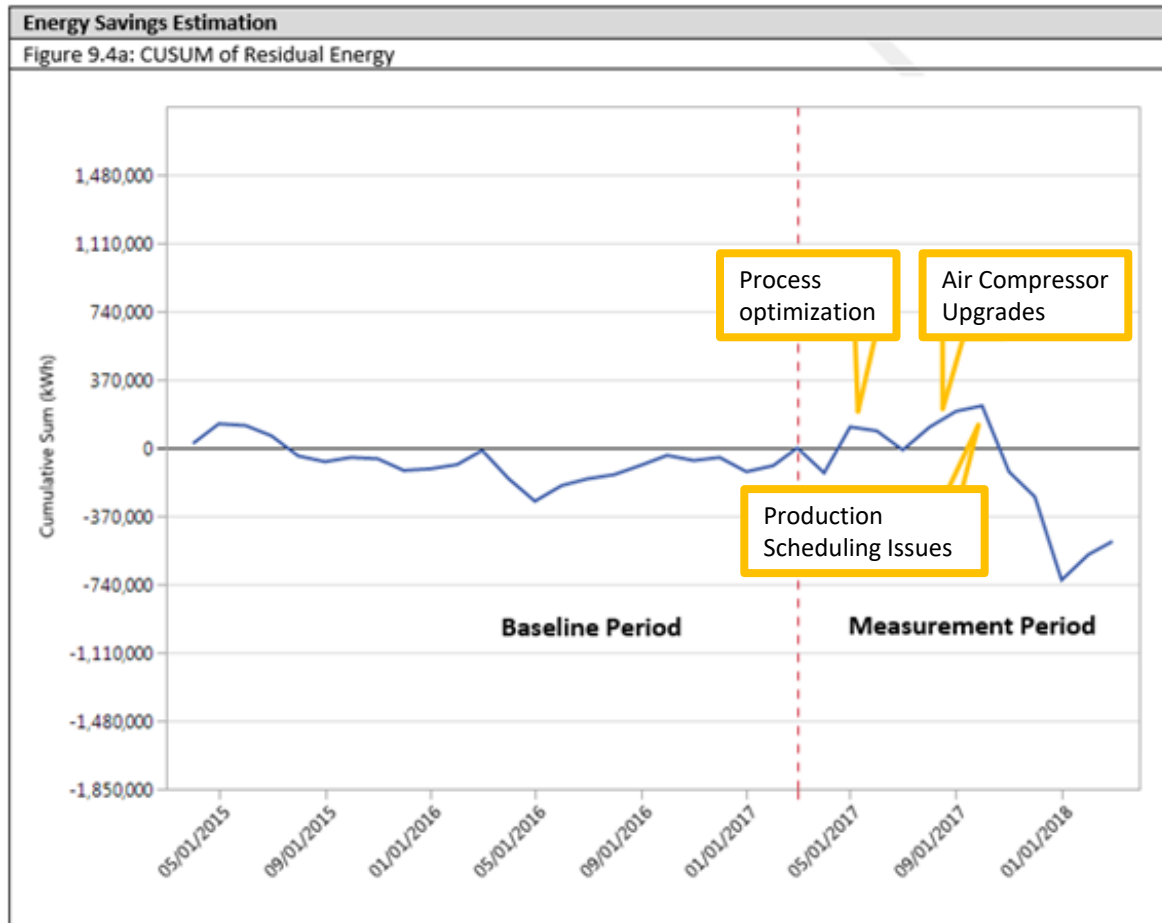
Non-SEM activities must be carefully accounted for in order to not **“double count” savings**. Usually **ex ante program savings for other projects** completed at the site is taken out of the results of the SEM claimed savings.

Sometime this **ex-ante savings is inaccurate**, resulting in the difference being captured in the SEM model. Some IC’s and utilities have used SEM models as a continuous commission tool calculating the impact of measures being installed at the site in real time.

Other times these **measures may have time sensitive issues**. They may be **reversed or not properly commissioned** resulting in strange behavior in the SEM model.

This can often be accounted for by **carefully understanding the other measures** installed at the site.

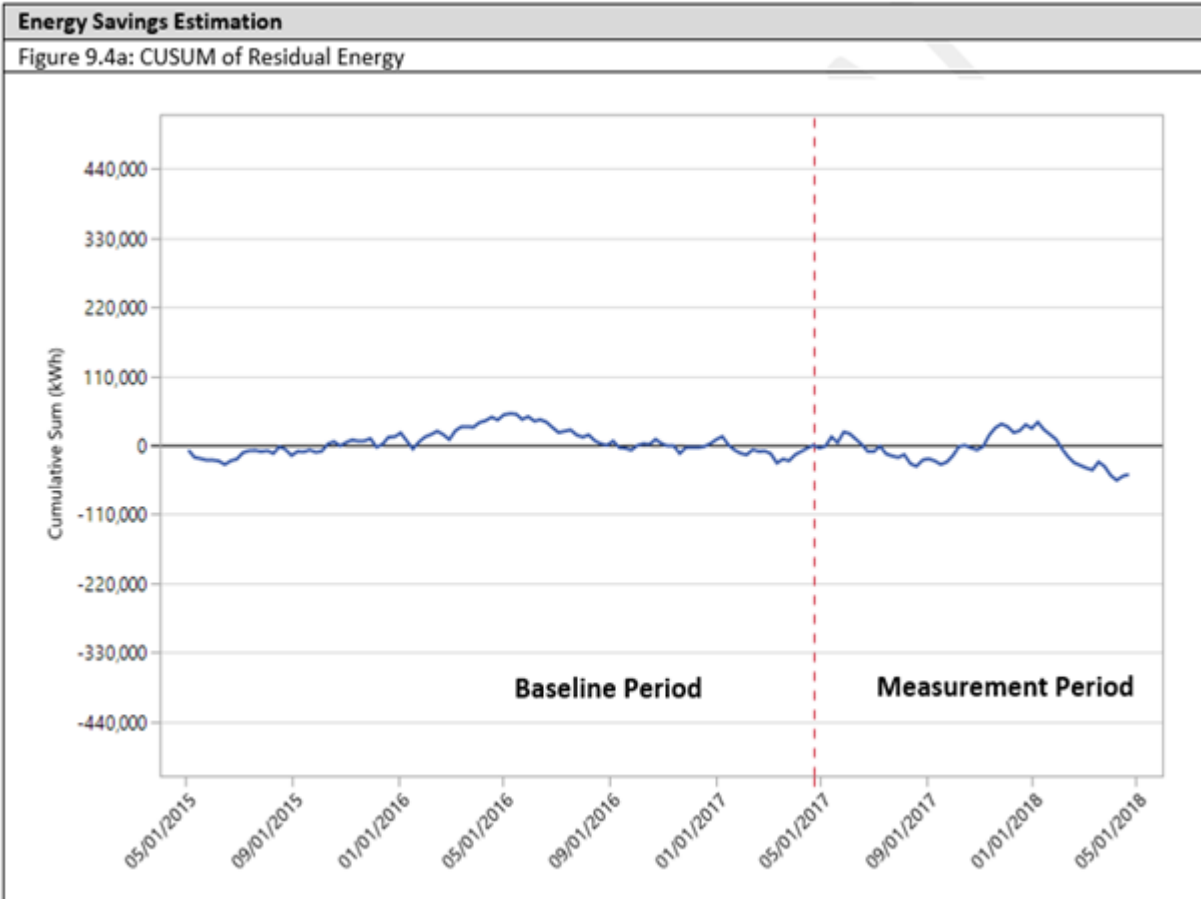
# Process/Operation changes



The SEM model is designed to **compare historic operational data** to current operation. If **current operation is very different** than historic operation the **model may no longer be accurate** at estimating energy savings. This could be due to issues such as new products, much higher flow, new machinery or other site wide operational changes.

If this is a **short-term issue**, the period of time when this change occurred **may be removed** and the savings could be re-annualized. If this is a **long-term issue**, a **new model** may be needed or a different calculation approach may be needed.

## Behavior same as base- Non Engage



Some customers will **not engage in the SEM** program. Although they attend training or have an audit, they choose **not to put recommendations into action**. In this case, the model will reflect this lack of change and show a **post period behavior that is very similar** to the pre case as show here.

## Recommendations from the focus group

- The SEM industry should consider the definition of Negative Savings as when an **increase in energy intensity** is seen in the statistically robust energy model *after* the program has **accounted for all identified externalities**.
- If negative savings are experienced in the **first year** (after accounting for known externalities), the assumption should be that **unknown externalities caused the negative savings** unless the negative performance can be linked to actions taken by the energy team. **Zero savings should be claimed.**
  - *We believe this recommendation does not bias claimed savings, based on the assumption that SEM activities do not cause an increase in energy intensity.*
- An **incremental loss of savings in future years** compared to claimed positive SEM savings in prior years within the measure life **should be recorded and claimed as negative customer savings**, while the top down modeling remains statistically robust and the program has accounted for all identified externalities. Negative savings should not be reported for energy intensity increases above and beyond baseline, unless the negative performance can be linked to actions taken by the energy team, due to the same assumption that SEM activities do not cause increased energy intensity.
- Our survey provided insight into varying degrees of persistence levels for SEM savings, and the group realizes that **persistence is interrelated** with whether or not to claim negative savings. **This should be studied further** to make any recommendations.



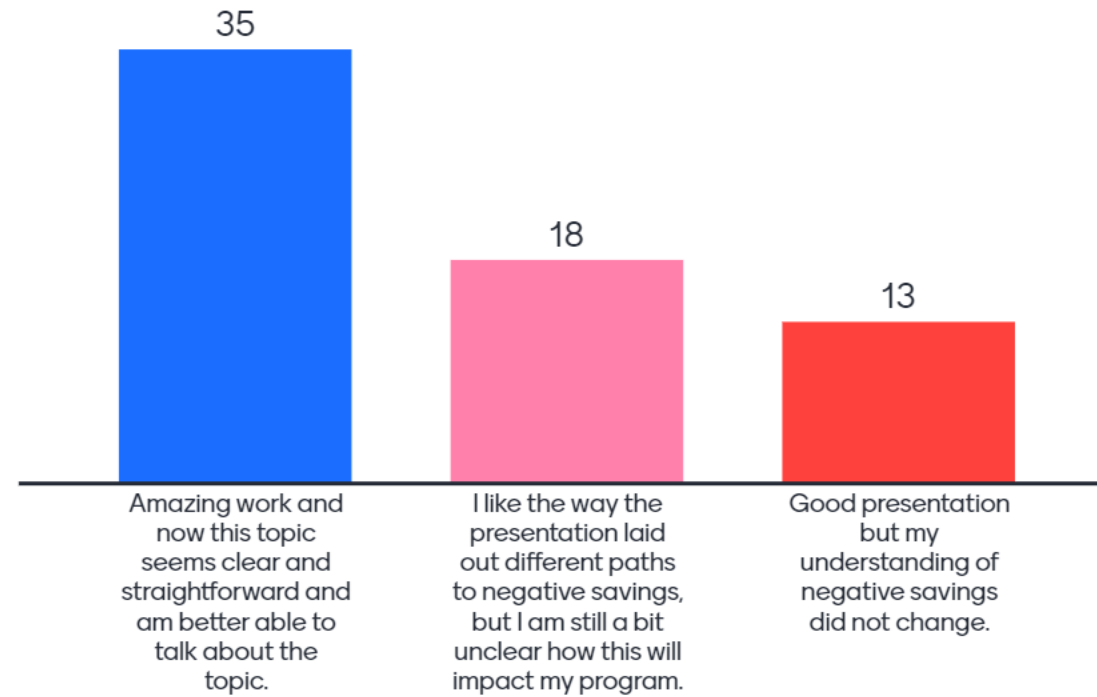
# Mentimeter Question

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How does the recommendations from the Negative Savings Group's presentation affect your understanding on the topic?

- Amazing work and now this topic seems clear and straightforward and am better able to talk about the topic.
- I like the way the presentation laid out different paths to negative savings, but I am still a bit unclear how this will impact my program.
- Good presentation but my understanding of negative savings did not change.

# How does the recommendations from the Negative Savings Group's presentation affect you understanding on the topic?



We Want Your  
Feedback!

<https://www.surveygizmo.com/s/3/5766144/2020-Virtual-SEM-Summit-Feedback>



A nighttime city skyline with various skyscrapers illuminated. The sky is dark with a purple and blue color cast and contains many small white stars. The water in the foreground reflects the city lights.

# Participant Insights

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# Commercial/SMB SEM Barriers

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Discuss some of the reasons you and/or your program has not begun to incorporate commercial/SMB into SEM.

OR

If you do incorporate commercial/SMB in your SEM programs, what are some of the reoccurring barriers or struggles you see from you commercial/SMB participants?

# Mentimeter Question

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What are some of the barriers that your groups came up with?

# What are some of the Commercial/SMB SEM barriers that your group came up with?

cost

cost effectiveness

cost

Data inaccessibility

Competitor owns the space

less energy usage

Tough to be cost effective.

Engagement takes \$

Cost Effectiveness

Leadership

Cost

variation in needs



# What are some of the Commercial/SMB SEM barriers that your group came up with?

Dedicated staff

Recruitment challenges, Owners dont have time!

Savings and cost effectiveness

scalability of methods and tools

programs designed to target large customers

Capacity issues

Mixed incentives.

Limited staff and cost effectiveness

Cost

Lack of staffing, monetary resources to justify investment

One participant said that COVID has

Time commitment by SMB owners.





# What are some of the Commercial/SMB SEM barriers that your group came up with?

Lack of staffing, monetary resources to justify investment

cost

Business is short-term focused, not horizon

cost-effectiveness

One participant said that COVID has been a barrier.

Time to participate

Utilities incentives kWh saving and it's hard to get that out of SMB

Time commitment by SMB owners.

Fewer resources/staff

Cost effectiveness

finding the right person



# What are some of the Commercial/SMB SEM barriers that your group came up with?

They don't think it worth the effort in saving. :)

Challenge simplifying enough for SMBs

Don't own assets. High employee turnover. Property manager (not company) manages the building.

Cost effective delivery

Alignment of management focus on SEM

Cost effectiveness of cohort model & Tenant vs. owner engagement

Relatively few staff members.

small energy teams and limited resources/people

when you are a hammer, everything is a nail

disruption

Low savings (relatively large, but not as large as larger users)



# What are some of the Commercial/SMB SEM barriers that your group came up with?

Don't own assets. High employee turnover. Property manager (not company) manages the building.

Relatively few staff members.

Low savings (relatively large, but not as large as larger users)

cost effectiveness

Cost effectiveness, one on one approach doesn't work

cost, complexity, not enough time/resources, interest, potential savings (\$)

non-standard building management makes M&V difficult

tenant vs ownership

SMB not enough energy for standard SEM



# What are some of the Commercial/SMB SEM barriers that your group came up with?

makes M&V difficult

tenant vs ownership

capacity to implement is lacking

To move to SMB, need to simplify modeling and approach,

Cost of M&V In person engagement takes time Small team

distributed operations makes it even harder (lots of micro mini buildings)

The savings to them are lower, so motivating them might be more of a challenge in some instances.

Statistical models often fail to predict energy consumption in buildings

SMB not enough energy for standard SEM

Owners don't have time/Dedicated staff

Siloed internal groups



# What are some of the Commercial/SMB SEM barriers that your group came up with?

Cost of M&V  
In person engagement takes time  
Small team

The savings to them are lower, so motivating them might be more of a challenge in some instances.

We need more Mahshas!

distributed operations makes it even harder (lots of micro mini buildings)

Statistical models often fail to predict energy consumption in buildings correctly

Owners don't have time/Dedicated staff

Siloed internal groups





GICW is only 1 of 160+ different Goodwill organizations in North America

# Goodwill Industries

## Who we are?

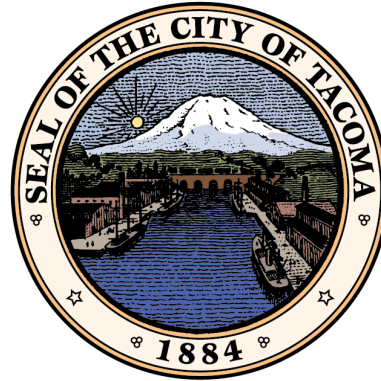
- 1927 Opened in Portland
- 2019 Opened 53<sup>rd</sup> Retail Location

## How we are Participating?

- 2015 Started with Energy Trust SEM Program
- 2020 tracking 43 retail stores through SEM

No matter what facility upgrade we preform a sustainable energy management requires change in an organization's culture in all levels





# **City of Tacoma WA**

## **Strategic Energy Management**

**Office of Environmental Policy and Sustainability**  
**Perry Spring, Resource Conservation Manager**  
**August 17, 2020**





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City Stats: population ~ 220,000, employees ~ 3,500

Municipal Building Portfolio: 113 buildings, 2.7M SqFt FA

Building energy: 211,693 MMBTU in 2019

Industrial SEM:

- Tacoma Power's H-PEM, 2014 to present,
- Central Treatment Plant, electricity only

Commercial SEM:

- Tacoma Power's pilot cohort, 2018 – 2020,
- Convention Center – 8,470 MMBTU baseline, 2,484,207 kWh)
- Police –Fleet Campus – 6,866 MMBTU baseline (2,013,800 kWh)



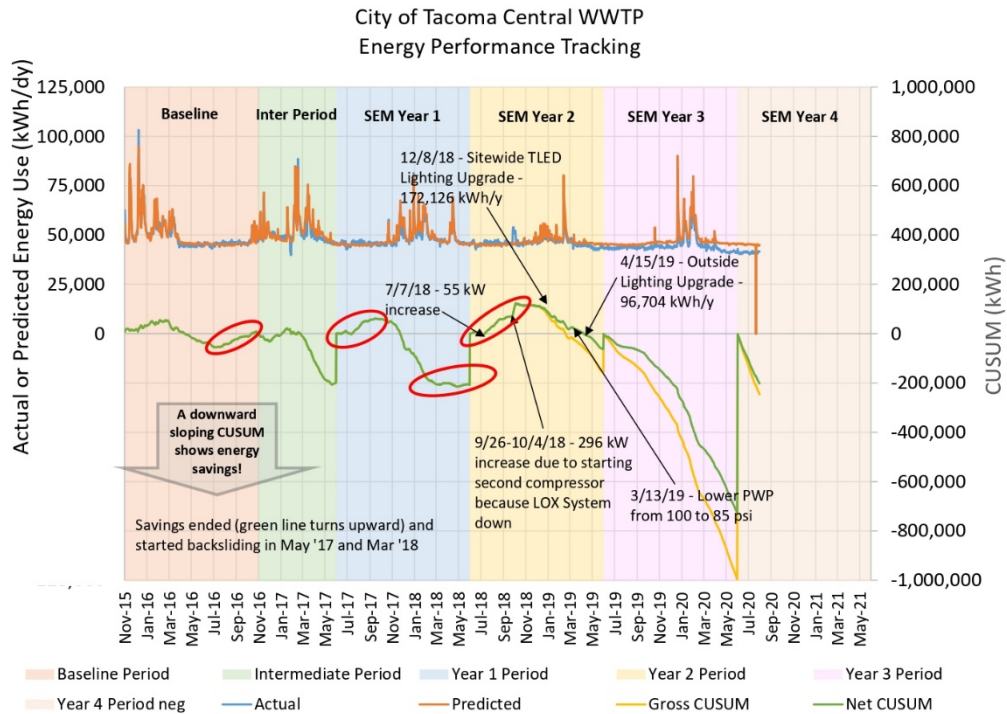
CUSUM = Cumulative Savings (resets annually)

Achieve or exceeded 3% savings goal annually since year 3.

Now in 2<sup>nd</sup> cycle of 4 years

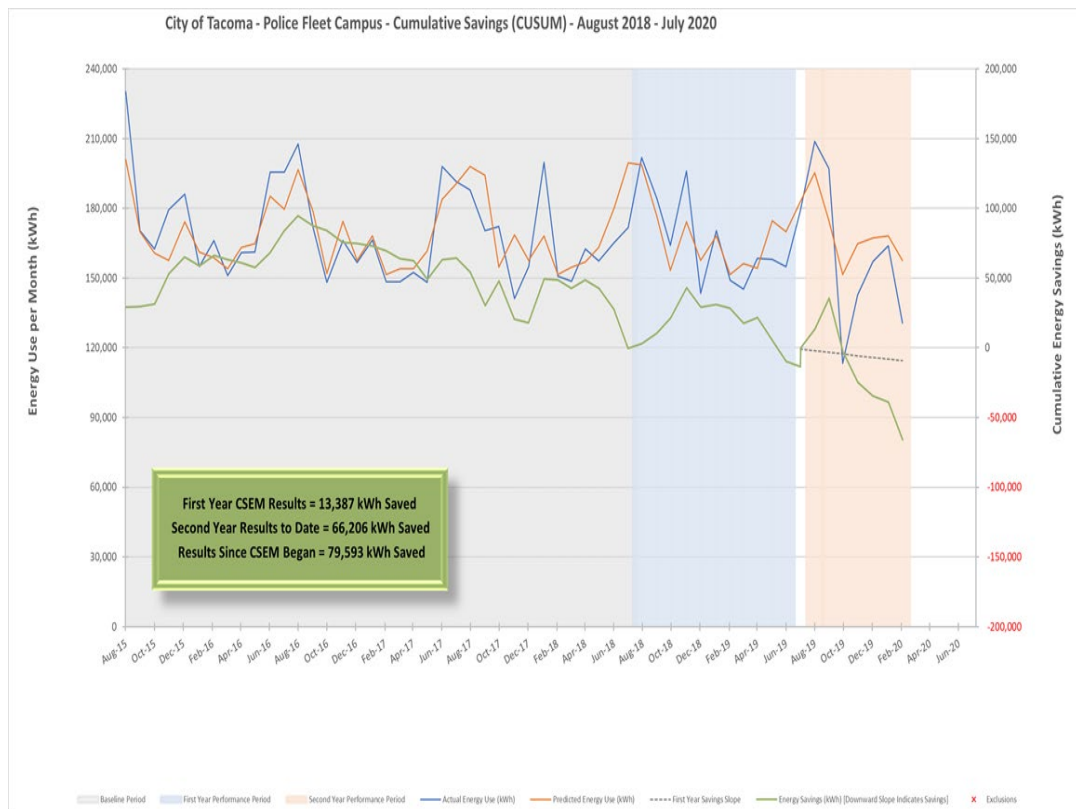
Process oriented, highly regulated = active monitoring and investment (time & \$)

1 Energy Champion, senior management (ADM, S&E)





## Police Fleet Campus



Year 1 – Team building, Building Energy Scans, Cohort Workshops, Opportunity Register, nominal savings

Year 2 – Significant progress on BAS controls tuning (both), new job classification- controls specialist

Program suspension at 19 months due to COVID

**SAVINGS over 19 months:**  
Convention Center @ 2.7%, Police – Fleet Campus @ 3.9%



# Solution Time!

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What did you learn during the panel that triggered some good ideas or solutions for the barriers we discussed?

# What did you learn at the SEM Summit that will inform how you go forward?

People to chat to!

Negative savings and public sector implementation

Still plenty of opportunity for growth!

Good ideas abound!

New connections

Internships!

made new contacts!

Good DEI direction

crunchy nutbutter only.

The importance for all of us at all levels of the SEM world to be thinking about DEI.

Need a champion but need a culture to make it last

Who to email with questions



# What did you learn at the SEM Summit that will inform how you go forward?

M&V challenges

SEM isn't just for Industrial facilities!

Data debates!

customer feedback

Potential for SMB engagement

Evaluators support zeroing out negative Energy savings.

Ca-Caw advances slides!

I like the idea of regional energy champions/sem alums

How others are accounting for COVID-19 impacts on SEM savings

Cleared understanding of how to measure savings, negative too



# What did you learn at the SEM Summit that will inform how you go forward?

customer feedback

Ca-Caw advances slides!

measure savings, negative too

Non-routine adjustments...Let's get to work!

Small-mid size commercial customers are of particular interest and are particularly difficult to engage

That there's a NW SEM collaborative

Love the high school internship program!

the hazards of kale

Keep learning and talking!

Importance of building infrastructure for SMB

DEI!

There is more work to be done



# What did you learn at the SEM Summit that will inform how you go forward?

Love the high school internship program!

Create an alumni mindset from the onset!

DEI can help solve many of these issues of organization engagement. Just have to get over the hurdle of making it happen

Importance of building infrastructure for SMB

Looking forward to research findings!

Learned more about the wide DOE portfolio of tools, and now need to think about how to integrate them into SEM curriculum

DEI:

There is more work to be done

That some of these M&V folks don't already know each other and we need a site-level working group!

Inclusion, internships, alumni network planning, and SMB ideas



# What did you learn at the SEM Summit that will inform how you go forward?

I have a lot of wonderful peers in this space. Glad to be in this together!

How 50001 Ready is starting to be used

50001 Ready valuable tool

Insight on negative savings,

Look for ways to capture evidence of activity that supports persistence like giving a raise to employees who support and participate consistently.

Potential and pitfalls of pre/post models to estimate COVID impacts.

We are missing SEM programs!

The negative savings subcommittee endorses a position that is not consistent with impact evaluation practices.

Great direction for applications in public sector.





# What did you learn at the SEM Summit that will inform how you go forward?

50001

50001 Ready valuable tool

Insight on negative savings, opportunities to address commercial market barriers, incorporating small medium business in large cohorts for cost effectiveness, potential K-12 engagements

Potential and pitfalls of pre/post models to estimate COVID impacts.

We are missing SEM programs!

SEM stakeholder collaboration, SEM, Targeting business in at-risk health communities

Great direction for applications in public sector.





Wrap Up

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We want you!

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# How to be involved

## Join the LT!

- Survey out this week
- Apply by September 1
- Decision end of October

## Support NASEMC

- General Support
- Deliverable Support

## Event Sponsor

- SEM Summit
- Webinars



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# Leadership Team Recruitment

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# Leadership Team Makeup

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- 2-4 SEM program administrators
- 2-4 SEM professionals
- 1-2 representatives of REEOs
- 1-3 other SEM-related roles
- At least one representative from each region of North America
- At least 4 members from traditionally under-represented populations



# Commitment

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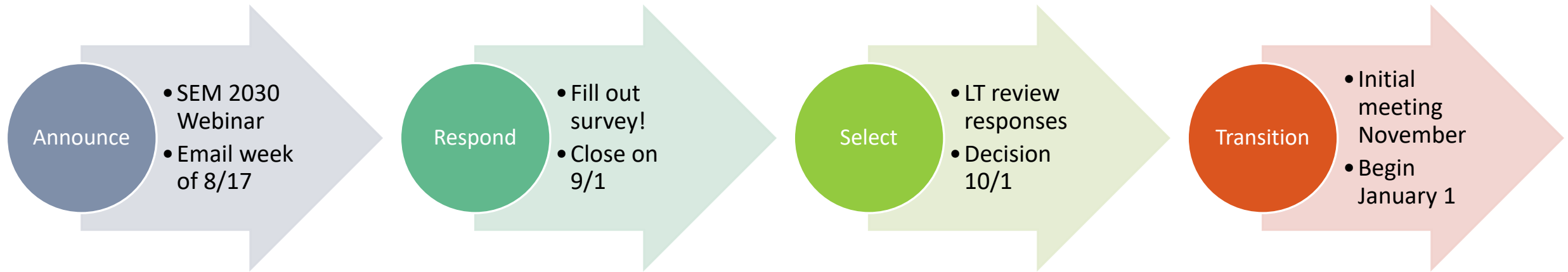
- Monthly LT Meetings
- Serve on ad hoc committees
- Partake in annual SEM Summit
- Support fundraising efforts
- Term is three years



**VOLUNTEER**

# Recruitment Process

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*Learn  
from  
successes  
of your  
peers*

*Expand and  
establish SEM  
best practices*

*Better  
serve  
your  
customers*

*Engage in research  
& discussions that  
further the practice  
of SEM*

Support the  
**future** of the  
Collaborative

Thanks for coming!

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# APPENDIX

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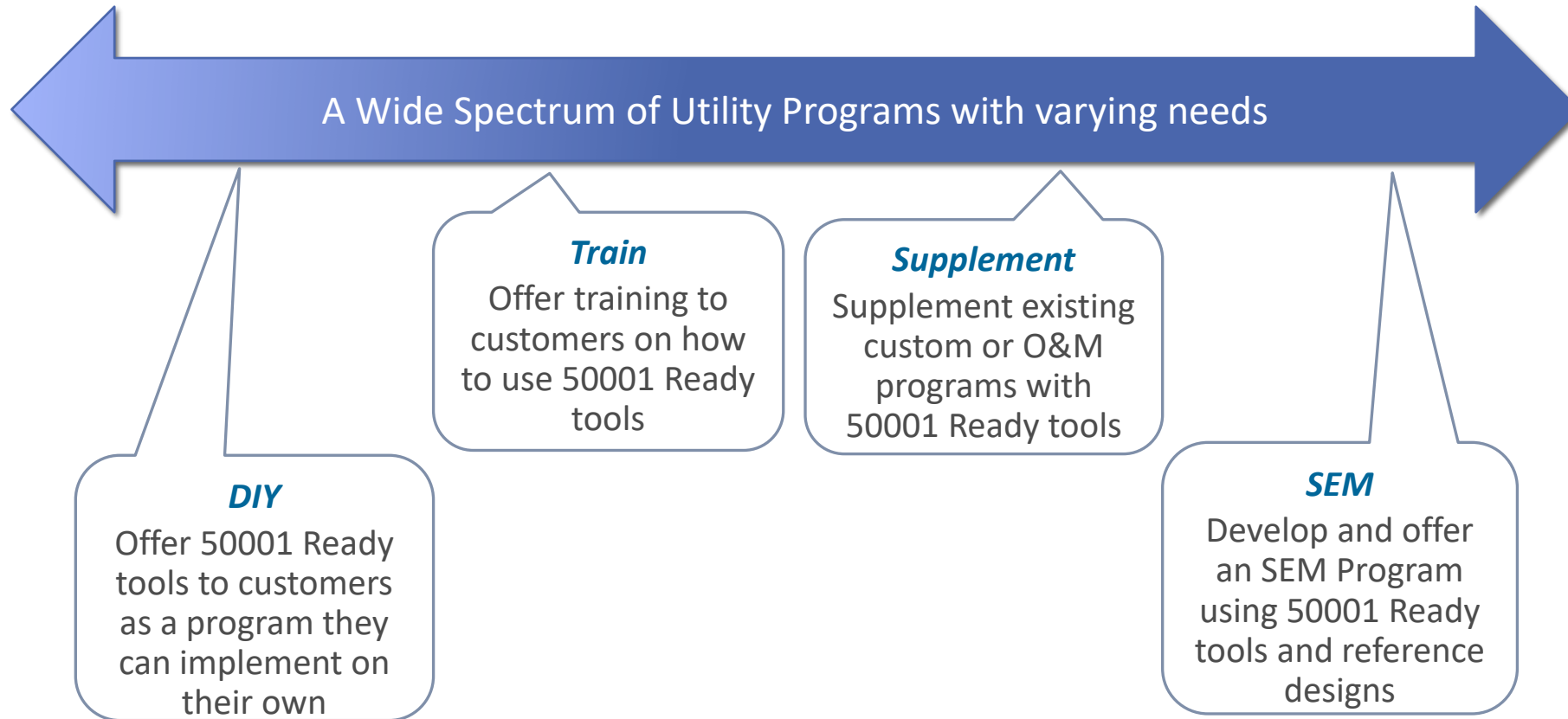
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# An update on the 50001 Ready Program and Navigator platform

*Options and resources for utility  
programs and implementers*

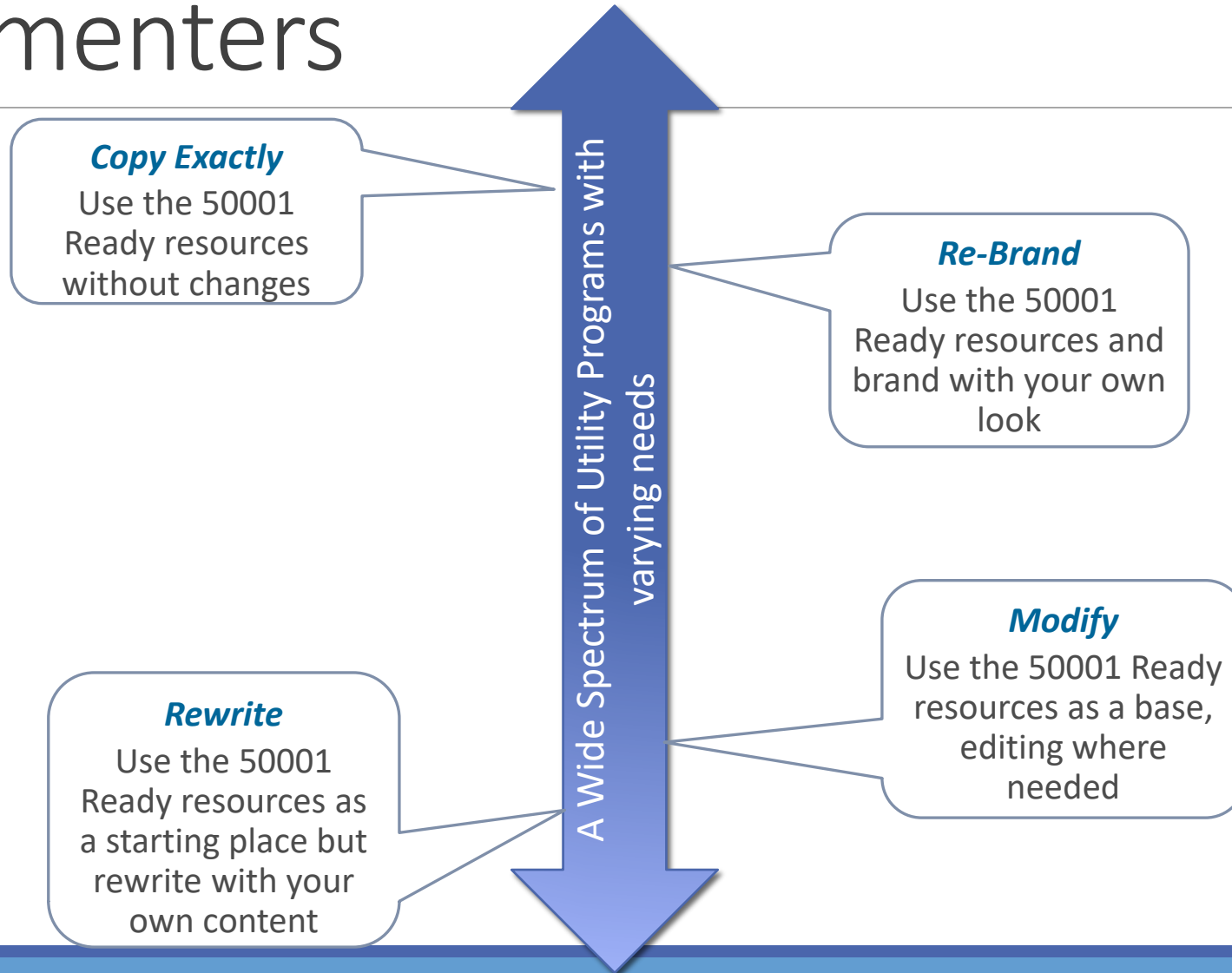
# 50001 Ready Program for Utilities and Implementers

The 50001 Ready program is designed to be used by program administrators and implementers in whatever way fits their goals

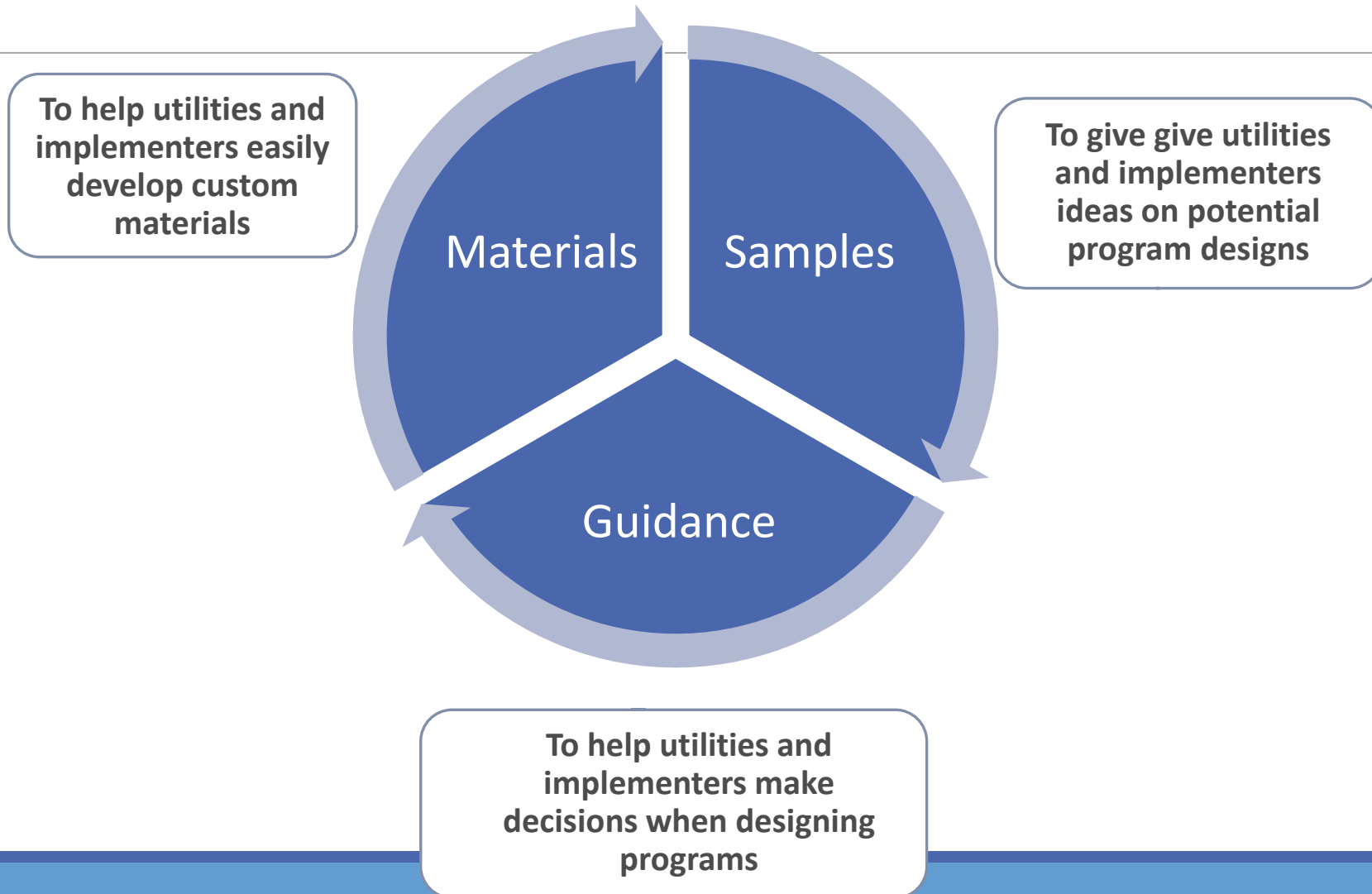


# 50001 Ready Program for Utilities and Implementers

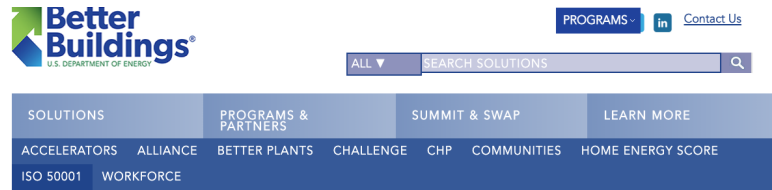
50001 Ready resources can be used in whatever way is best for each program



# Administrators and Implementers



# Partner Program – DOE Website



## 50001 READY FOR UTILITIES, IMPLEMENTERS, AND ENERGY SERVICE PROVIDERS

50001 Ready is an approach for facilities to establish a continuous energy improvement practice in conformance with the ISO 50001 voluntary standard for energy management systems in industrial, commercial, and institutional facilities. The standard is complementary to other professional benchmarks and certifications, such as ENERGY STAR® or LEED; implementation of an ISO 50001 structure can improve a facility's performance within other energy commitments.



The 50001 Ready program offers your customers:

1. A self-paced, no cost, do-it-yourself approach to implement ISO 50001 practices without certification
2. Improved guidance to identify facility-wide energy use and develop action plans for performance improvement
3. A means to quantify and track overall facility energy savings across all fuels, including the ability to separate capital projects from operations and maintenance improvements

## DOE'S 50001 READY PARTNER PROGRAM

How can energy efficiency program administrators engage with the 50001 Ready program?

As interest in 50001 Ready™ accelerates, private and public organizations are incorporating the continual improvement practices from the 50001 Ready Navigator™ into their business-to-business and utility program offerings. DOE is seeking to partner with U.S.-based organizations to expand the use and increase end-user benefits of 50001 Ready assets.

### IMPROVE COMPETITIVENESS AND REDUCE OPERATIONAL COSTS WITH 50001 READY'S FULL SUITE OF TOOLS

By joining 50001 Ready, commercial and industrial facilities become leaders in energy management and their experiences will help guide DOE as it supports the adoption of these systems across the U.S. economy.

#### PARTNER ADVANTAGES:

- Portfolio view of 50001 Ready Navigator, including bird's eye view of customer and cohort progress
- Partner logo added to customized 50001 Ready Navigator
- Partner logo included on DOE 50001 Ready recognition certificate issued by DOE.
- Partner developed custom guidance for each 50001 Ready Navigator task.

Administration of 50001 Ready Navigator Partner Agreement is provided by LBNL on behalf of DOE. Communication with LBNL is available via email at [50001Ready@lbl.gov](mailto:50001Ready@lbl.gov).

#### SIGNING UP IS SIMPLE:

1. Submit a Partner Request form  
Eligible organizations may submit a Partner request [here](#)
2. We'll review your submission, then set up call  
LBNL staff at the 50001 Ready Help Desk will review the "50001 Ready Partner Request" form and provide next steps.
3. Agree to the program terms and formalize the partnership  
We'll need a signature to confirm your intention of meeting the terms outlined in the Partner Agreement and Partner Program Charter - *Partner term is valid for 3 years.*

INTERESTED IN PARTNERING WITH 50001 READY?

[SIGN UP TODAY >](#)

The Partner Program features an open and flexible system to work with your business structure and current set of offerings to support your customers with 50001 Ready and EnMS implementation.

To learn more about the 50001 Ready Partner Program, visit the **Better Buildings Solutions** website at: [Energy.gov/50001Ready](https://energy.gov/50001Ready). "50001 Ready for Program Administrators & Implementers", "DOE'S 50001 Ready Partner Program" section at top of page

<https://betterbuildingsolutioncenter.energy.gov/iso-50001/50001Ready/50001-ready-program-utilities-admin-implementers>

To sign up, click the link to fill out a **Partner Requisition** form



# Signing Up - Partner Requisition Form

**50001 Ready Navigator™ Partner Requisition Form**

My organization is committed to effective energy management, agrees to the terms outlined in this agreement, and wishes to become a 50001 Ready Partner.

**Organization Details**

ORGANIZATION NAME  GENERAL PHONE NUMBER

STREET ADDRESS -LINE 1  STREET ADDRESS -LINE 2

CITY  STATE / PROVINCE  ZIP CODE / POSTAL CODE

---

**Primary Contact**

FIRST NAME	LAST NAME	EMAIL	PHONE NUMBER	ZIP CODE
<input type="text" value="Amy"/>	<input type="text" value="Pevzner"/>	<input type="text" value="arp@lbl.gov"/>	<input type="text"/>	<input type="text" value="94720"/>

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**Alternate Contact**

FIRST NAME	LAST NAME	EMAIL	PHONE NUMBER	ZIP CODE
<input type="text" value="optional"/>	<input type="text" value="optional"/>	<input type="text" value="optional"/>	<input type="text"/>	<input type="text" value="optional"/>

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STATEMENT OF HOW YOUR ORGANIZATION INTENDS TO USE THE 50001 READY NAVIGATOR AND OTHER 50001 READY ASSETS.

DESCRIPTION OF TARGET SECTORS THAT WOULD BE INCLUDED UNDER YOUR 50001 READY NAVIGATOR™ PARTNER PARTICIPATION COHORT.


Link found on the Better Building Solution site or <https://navigator.lbl.gov/partnerEnrollmentForm>

**\*You'll want to set up an account in the Navigator first.**

**Just complete this form and the 50001 Ready Help Desk will contact you with next steps!**

# Partner Dashboard

Select One ▾



**Partner: ABC Utility**  
Partner Dashboard

<b>Partner Information</b>	Contact: Peter Therkelsen Email: <a href="mailto:ptherkelsen@lbl.gov">ptherkelsen@lbl.gov</a> Phone: 5104865645 Reference Code: ABC Utility	<a href="#">Partner Instructions, Guidance, and Referral Links</a> <a href="#">Update General Information</a> <a href="#">Manage Associated Users <span style="font-size: small;">4</span></a>
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**Partner Task Tips** Tips connecting partner activities to Navigator tasks. Default tips appear for all cohorts unless specific cohort tips provided.

[Update Default Partner Tips](#)
[Download](#)

**Total Connected Projects: 4 | Related Activity**

	<b>New Projects</b>	<b>Tasks Ready</b>	<b>Tasks Completed</b>	<b>DOE Recognition</b>	<a href="#">View More Details</a>
<b>TOTAL</b>	3	6	32	-	

Project Not Assigned to a Specific Cohort: 1    Related Task Progress: 100%    [filter projects](#)

Partner Cohorts (sub groupings)    [+ Add Cohort](#)

Internal Title	Public Title	Reference Code	Projects	Task Tips
ABC Cohort Pilot Program	Manage Energy!	ABC SEM Pilot	1 0%	<a href="#">Add Cohort Tips</a> <a href="#">Download</a> <a href="#">filter projects</a> <span style="color: red;">✕</span>
ABC Cohort 2019	Manage Energy!	ABC SEM Cohort 2019	2 14%	<a href="#">Update Cohort Tips</a> <a href="#">Download</a> <a href="#">filter projects</a> <span style="color: red;">✕</span>

⚠ Important Note: Add custom contact information and/or task tips to cohorts to override the general contact information and tips; otherwise general information will be provided for connected projects in that cohort. "unassigned" projects always see the general information.

[Click HERE to Update Cohort Assignments \(unsaved cohort assignments will be lost.\)](#)

Project	Task Progress	Cohort (internal title)	Last Action																									
Comical Classroom K-12	16% <table style="font-size: x-small; border-collapse: collapse;"> <tr><td style="background-color: #28a745; color: white;">1</td><td style="background-color: #28a745; color: white;">2</td><td style="background-color: #28a745; color: white;">3</td><td style="background-color: #28a745; color: white;">4</td><td style="background-color: #28a745; color: white;">5</td><td style="background-color: #28a745; color: white;">6</td><td style="background-color: #28a745; color: white;">7</td><td style="background-color: #28a745; color: white;">8</td><td style="background-color: #28a745; color: white;">9</td><td style="background-color: #28a745; color: white;">10</td><td style="background-color: #28a745; color: white;">11</td><td style="background-color: #28a745; color: white;">12</td><td style="background-color: #28a745; color: white;">13</td></tr> <tr><td style="background-color: #6c757d; color: white;">14</td><td style="background-color: #6c757d; color: white;">15</td><td style="background-color: #6c757d; color: white;">16</td><td style="background-color: #6c757d; color: white;">17</td><td style="background-color: #6c757d; color: white;">18</td><td style="background-color: #6c757d; color: white;">19</td><td style="background-color: #6c757d; color: white;">20</td><td style="background-color: #6c757d; color: white;">21</td><td style="background-color: #6c757d; color: white;">22</td><td style="background-color: #6c757d; color: white;">23</td><td style="background-color: #6c757d; color: white;">24</td><td style="background-color: #6c757d; color: white;">25</td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	ABC Cohort 2019	05/10/2019 <a href="#">Notes 0</a> <span style="color: red;">✕</span>
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**Banner** indicates your location within the tool


Add or Update **General Tips**

Add or Update **Cohort Tips**

Track **projects, task progress, cohort assignments and notes**

# Partner Dashboard - Update General Information

## Partner Contact Details

**Partner: ABC Utility**  
General Contact Information

[← Back to Partner Dashboard](#)

TITLE

REFERENCE CODE

**▲** Navigator projects can enter this Reference Code during setup or on the Manage Project page to immediately connect with this Cohort. Changing this Reference Code will automatically update project already connected.

PARTNER PUBLIC CONTACT NAME

PARTNER PUBLIC E-MAIL ADDRESS


PARTNER PUBLIC PHONE

PARTNER PUBLIC WEBSITE

ADDITIONAL PUBLIC INFORMATION ABOUT PARTNER SUPPORT

PARTNER LOGO (DISPLAYED AT THE TOP OF THE PAGE)

The 50001 Ready Navigator is a resource of the Department of Energy's Advanced Manufacturing Office.

**Partner: ABC Utility**  
Manage Users

[← Back to Partner Dashboard](#)


[+ Add New Associated User](#)

Name	Email	Access Level		
Peter Therkelsen	<a href="mailto:ptherkelsen@lbl.gov">ptherkelsen@lbl.gov</a>	Full Administrator Access	<a href="#">update access levels</a>	<a href="#">remove</a>
Sandy Glatt	<a href="mailto:sandy.glatt@ee.doe.gov">sandy.glatt@ee.doe.gov</a>	Full Administrator Access	<a href="#">update access levels</a>	<a href="#">remove</a>
Amy Pevzner	<a href="mailto:arp@lbl.gov">arp@lbl.gov</a>	ABC Cohort 2019: Full Access	<a href="#">cannot modify self</a>	<a href="#">remove</a>
Michael B Muller	<a href="mailto:michael.b.muller@analyticalenergy.com">michael.b.muller@analyticalenergy.com</a>	ABC Cohort Pilot Program: Full Access	<a href="#">update access levels</a>	<a href="#">remove</a>

The 50001 Ready Navigator is a resource of the Department of Energy's Advanced Manufacturing Office.

[Contact Us](#) | [Advanced Manufacturing Office](#) | [Office of Energy Efficiency & Renewable Energy](#) | [Privacy](#)

## Manage Associated Users Access Levels

**Partner: ABC Utility**  
Update Access Levels

[← Back to Associated Users Table](#)

**Associated User: Peter Therkelsen**  
email: [ptherkelsen@lbl.gov](mailto:ptherkelsen@lbl.gov)

Full Administrator Access: **ON**

[Remove Full Administrator Access to Partner](#)


Click on the Access Level Below to Activate It  
Full Access - can update cohort contact info and tips

Cohort	Access Level		
ABC Cohort Pilot Program	<a href="#">Full Access</a>	<a href="#">Read Access</a>	<a href="#">No Access</a>
ABC Cohort 2019	<a href="#">Full Access</a>	<a href="#">Read Access</a>	<a href="#">No Access</a>

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# Tips and Customization - General Tips

**Partner: ABC Utility**  
**General Task Tips**

[← Back to Partner Dashboard](#)

Section: **Planning**


ID	Short Title	Task	Partner Tip
1	Scope and Boundaries	Task 1: We have defined, documented and approved the Scope and Boundaries of our 50001 Ready energy management system	This tip goes to all cohorts - Welcome to the cohort! Please bring your last 12 months worth of energy bills to your kick off workshop. <a href="#">Update Tip</a>
2	Energy Policy	Task 2: We have developed an energy policy statement, which has been approved by top management	This is a partner tip - it will appear for projects if there is not cohort specific tip - other wise the cohort specific tip will show up. <a href="#">Update Tip</a>
3	Management Commitment	Task 3: Our top management has expressed its commitment to the 50001 Ready system, and are aware of their roles and responsibilities	<i>no specific tip for this task</i> <a href="#">Update Tip</a>
4	Energy Team	Task 4: We have established an energy team that meets regularly and includes a management representative. Roles and responsibilities have been defined for the energy team and all affected personnel.	<i>no specific tip for this task</i> <a href="#">Update Tip</a>
5	Legal Requirements	Task 5: We have identified energy-related legal requirements that apply to our operations, have a process to evaluate and update these over time, and evaluated our compliance with them	<i>no specific tip for this task</i> <a href="#">Update Tip</a>

Section: **Energy Review**

ID	Short Title	Task	Partner Tip
6	Data Collection	Task 6: We have identified all our energy sources and uses and accurately collected the related energy consumption data	<i>no specific tip for this task</i> <a href="#">Update Tip</a>
7	Data Analysis	Task 7: We have analyzed our energy consumption data at the system/equipment level	<i>no specific tip for this task</i> <a href="#">Update Tip</a>
8	Significant Energy Uses (SEUs)	Task 8: We have determined our Significant Energy Uses (SEUs) and determined their energy performance, estimated future consumption and have a plan for reviewing and updating them.	<i>no specific tip for this task</i> <a href="#">Update Tip</a>
9	Relevant Variables	Task 9: We have determined the relevant variables that affect energy consumption of each SEU and collected the associated data.	<i>no specific tip for this task</i> <a href="#">Update Tip</a>
10	Performance Indicators (EnPIs)	Task 10: We have identified energy performance indicators (EnPIs) and developed a methodology for determining and updating them.	<i>no specific tip for this task</i> <a href="#">Update Tip</a>
11	Baselines, Objectives and	Task 11: We have established an energy baseline(s), approved objectives and energy	<i>no specific tip for this task</i> <a href="#">Update Tip</a>

**Partner tips** are seen by all projects associated with the partner.  
They are only overwritten by cohort specific tips.

# Tips and Customization - Cohort Specific Tips

 <b>Partner: ABC Utility   Cohort: ABC Cohort 2019</b> <b>Manage Energy! Task Tips</b>			
<a href="#">← Back to Partner Dashboard</a>			
Section: <b>Planning</b>			
ID	Short Title	Task	Partner Tip
1	Scope and Boundaries	Task 1: We have defined, documented and approved the Scope and Boundaries of our 50001 Ready energy management system	<p><b>Currently Providing This General Partner Tip:</b> This tip goes to all cohorts - Welcome to the cohort! Please bring your last 12 months worth of energy bills to your kick off workshop.</p> <p><b>This Cohort Tip currently overrides the General Tip:</b> Many organizations have policies that could be augmented to be a full energy policy! Bring to the June workshop any sustainability, environmental, or other policy statements you think might serve as the basis for an energy policy.</p>
2	Energy Policy	Task 2: We have developed an energy policy statement, which has been approved by top management	<p><b>This is a Cohort Specific Tip (no General Tip):</b> Commitment can be verbal, email, or other. The energy policy we are working on in June should help solidify and document commitment.</p>
3	Management Commitment	Task 3: Our top management has expressed its commitment to the 50001 Ready system, and are aware of their roles and responsibilities	<p><i>no specific tip for this task</i></p>
4	Energy Team	Task 4: We have established an energy team that meets regularly and includes a management representative. Roles and responsibilities have been defined for the energy team and all affected personnel.	<p><i>no specific tip for this task</i></p>
5	Legal Requirements	Task 5: We have identified energy-related legal requirements that apply to our operations, have a process to evaluate and update these over time, and evaluated our compliance with them	<p><i>no specific tip for this task</i></p>
Section: <b>Energy Review</b>			
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6	Data Collection	Task 6: We have identified all our energy sources and uses and accurately collected the related energy consumption data	<p><i>no specific tip for this task</i></p>
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10	Performance Indicators (EnPIs)	Task 10: We have identified energy performance indicators (EnPIs) and developed a methodology for determining and updating them.	<p><i>no specific tip for this task</i></p>

Optimize efforts and accelerate progress using **tips** for each task

Cohort tip page highlights when a tip is being provided from the **Partner Tips** or **Cohort Tips**

# Tips and Customization – Cohort View

The screenshot shows a task management interface for a task titled "Task 1: We have defined, documented and approved the Scope and Boundaries of our 50001 Ready energy management system". The interface includes a progress bar at the top with steps 1 through 5, and a "Tasks:" dropdown menu. A "Get Help" box on the right contains links for "Contact Manage Energy!", "50001 Ready Help Desk", and "View Learning Module". Below the task title, there are filters for task status: "Not Started", "In Progress", "Ready For Review", and "Completed". A section for "Your roles for this task" lists "Contributor & Approver". A "Partner Task Guidance From:" box shows "Manage Energy!". Below that is a "Cohort Specific Tip HERE" box. The "Detailed Guidance: Scope and Boundaries" section has tabs for "Getting It Done", "Task Overview", "Full Description", "Notes", "Resources", "History", and "Assignments". The "Notes" tab is active, showing a note from Amy Pevzner dated 05/14/2019 with the text "Use blueprints provided at the meeting to define scope and boundaries". There is an "Add a Note" section with a text input field and a "Save" button. At the bottom, there are links for "Need assistance?", "Contact the 50001 Ready Help Desk", "Download as PDF", and "BACK TO TOP".

Provide immediate client support to your customer every step of the way.

Tips distributed to all cohorts display in the bar above the detailed guidance for each task.

Customers can still add their own notes for each task.

# Tips and Customization – Customer View

Select One ▾

Partner: Amy's Amazing Army of Acrobatic Ants | Cohort: Anteaters  
Edit Task Tip ←

← Back to Task Tips

Short Title: Scope and Boundaries

Task 1: We have defined, documented and approved the Scope and Boundaries of our 50001 Ready energy management system

TASK TIP - SHOULD CONNECT PARTNER RELATED ACTIVITIES TO TASK GUIDANCE

Update Task Tip

**Additional Task Guidance (for reference)**

Getting it Done

- With management input, complete the [Scope and Boundaries Worksheet](#) to define the scope and boundaries of the energy management system (EnMS).
- Develop an EnMS Scope and Boundaries Statement.
- Have top management approve the Statement and communicate it across the organization.

**Task Overview**

Top management defines the scope and boundaries of your organization's energy management system (EnMS). The scope and boundaries enable your organization to focus efforts and resources by defining what the EnMS includes. The scope identifies the extent of the activities and which facilities and decisions are included in the EnMS, and it can include several boundaries. The boundaries are the physical, site and/or organizational limits defined by your organization as the "fence line" of the EnMS.

When defining the scope and boundaries, energy-using equipment or systems should not be excluded unless they are separately metered or a dependable calculation can be made. Once the scope and boundaries are defined, an organization cannot exclude energy sources that cross or are within the defined boundaries of the EnMS.

EnMS scope and boundaries could include the building management operations of one or more commercial buildings at one or more specific locations; the manufacturing, warehousing, and distribution activities at a particular plant; or multiple facilities of a corporation at multiple sites, to name just a few. In many cases, the scope and boundary only includes one building or facility.

**At the completion of this task, you will have...**

- Identified the extent of activities, facilities, and decision structures to be included in your EnMS
- Defined site limits and/or organizational limits of your EnMS
- Developed a scope and boundaries statement for your EnMS

*This guidance is relevant to sections 4.1, 4.2.1, and 4.5.4.1 of the ISO 50001:2011 standard.*

**Full Guidance**

- Identify the extent of activities, facilities, and decision structures to be included in your EnMS
- Define site limits and/or organizational limits of your EnMS
- Develop a scope and boundaries statement for your EnMS

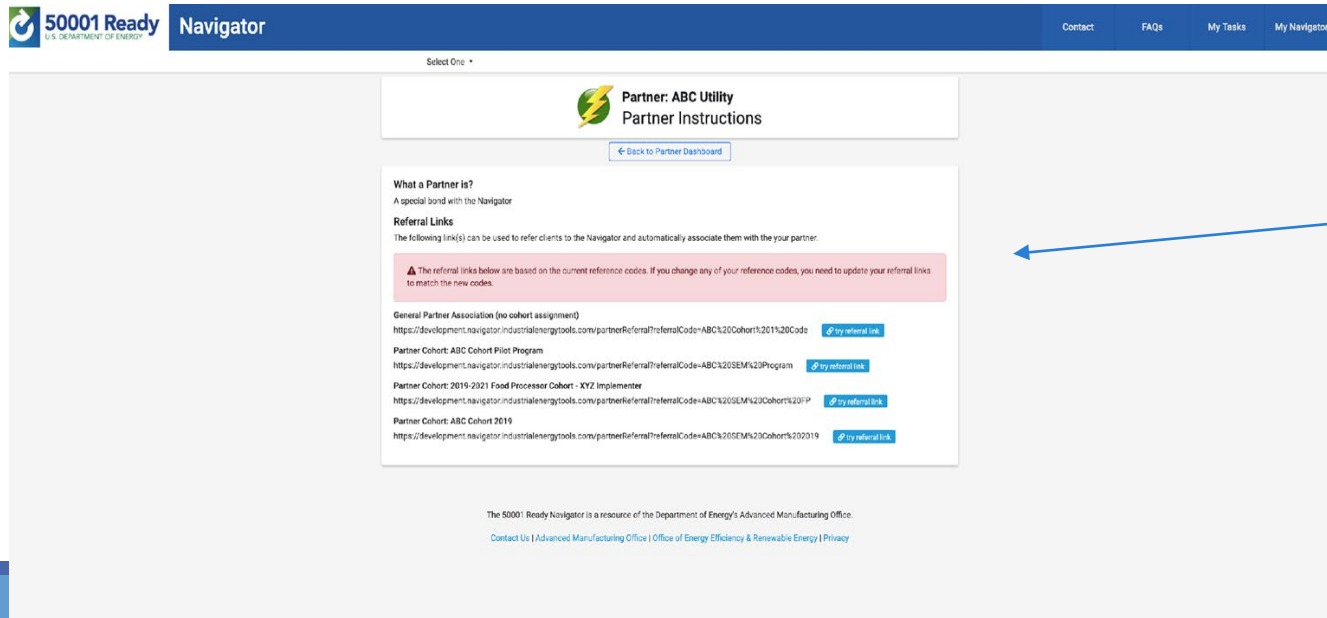
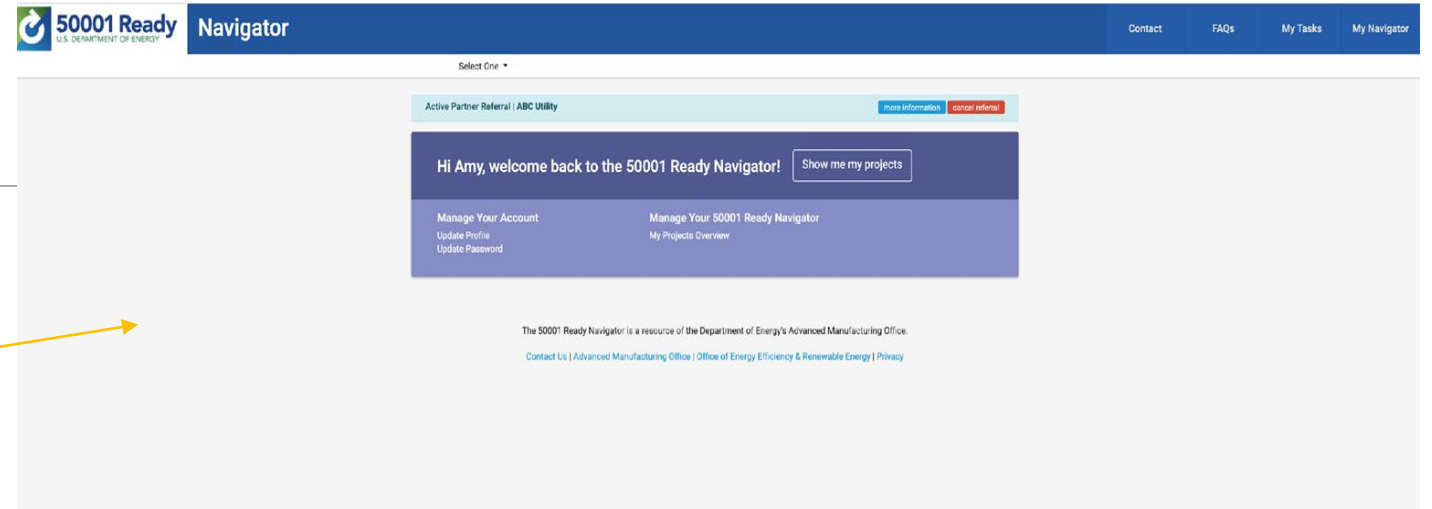
Customer sees the Partner's logo and tips.

Logo defaults to Partner logo – can be replaced with cohort specific logo.

The tools customizable interface helps you and your customers with **supporting, observing, and reporting on** your EnMS progress

# Cohorts

Clients can join a cohort using **Referral Links** for quick registration



**Reference Codes** can be customized to your preferences



## Energy Management System and 50001 Ready Introduction Materials

50001 Ready Brief Introduction for End-Users

50001 Ready General Introduction for End-Users

Energy Management System Informative Training

Energy Management System Informative Training for Utility Program Administrators

50001 Ready Multi-Site Implementation Distance Learning for Central-Office Staff

## 50001 Ready Task Education Materials

50001 Ready Training for Utility Energy Efficiency Staff

50001 Ready In-plant Training for Manufacturers

## 50001 Ready Implementation Materials

50001 Ready Distance Learning Series for All Organizations

50001 Ready Distance Learning Series for Federal Organizations

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## 50001 Training Categories

- Material Introduction
- Task Education
- EnMS Implementation

## Utilities and Partners already engaged with 50001 Ready:

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## Questions?

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Visit the 50001 Ready website at [energy.gov/50001Ready](https://energy.gov/50001Ready)

- Download sample utility partner profiles and program implementation guides
- Find links to the Navigator and EnPI Lite

### Stay informed

- CONTACT [ethan.rogers @ee.doe.gov](mailto:ethan.rogers@ee.doe.gov) to add others to this utility network distribution list.
  - Sign up at [energy.gov/50001Ready](https://energy.gov/50001Ready) for email updates about ISO 50001 and related DOE energy management programs.
-

# Test Baseline Validity

Evaluators will test if the baseline used by the program is valid for the period measured. Several tools available:

1. Established (will source):

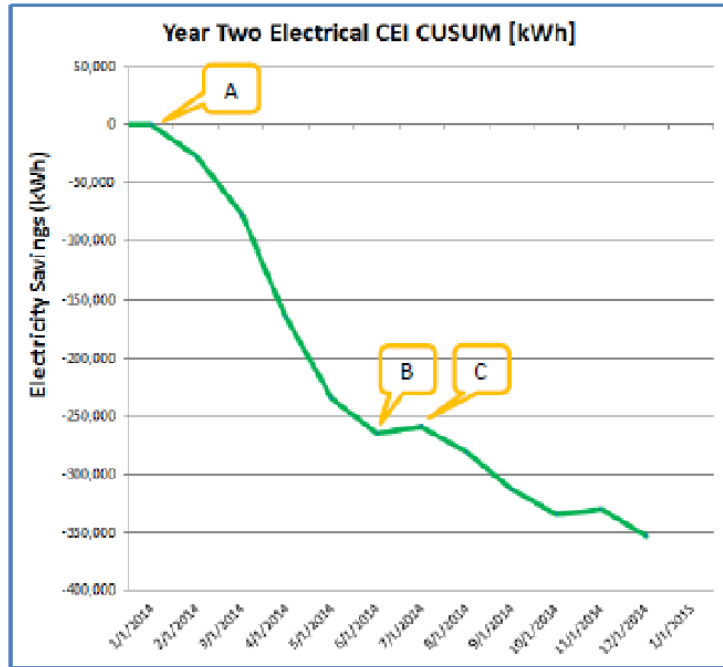
- a. Fractional Savings Uncertainty (FSU)
- b. Net Determination Bias (NDB)
- c. CV(RMSE)
- d. t-Tests for individual variables
- e. Adjusted  $R^2$
- f. Model F-Statistic

2. Additional statistical tools:

- a. AIC/BIC for model comparisons
- b. Mean Absolute Percentage Error (MAPE) for within-sample
- c. k-Fold MAPE for out-of-sample
- d. Median Percentage Error
- e. Mahalanobis' Distance (to identify outliers)
- f. Data visualizations (added variable plots, error distribution, leverage & influence plots)

# Short-Term Changes

Figure A-2: CUSUM of Residual Energy for Year Two (Zoom View)



This site had a major shutdown for repairs that impacted several buildings. This event occurred between points A and B, resulting in significantly less energy usage during this period. Once the building repairs were complete, the site continued to show energy savings but at a much lower rate than what is seen between A and B.

In order to account for this short-term operation change, the energy savings between A and B were removed and the savings that occurred during normal operation was annualized in order to represent a typical year.

This approach is useful when changes are temporary and short lasting (perhaps 3 months maximum). Some examples are equipment malfunction, site shutdown, or other temporary site wide changes.

### Year Two Program Intervention Points

The intervention points shown above represent operational changes that had an impact on energy intensity

Item	Description	Date Implemented
A	Shutdown of non-essential lighting and equipment in construction area	January 2014
B	Lighting and other utilities brought back on line in construction areas	June 2014
C	Shut down procedures at end of shift	July 2014

# Post-Installation Modeling

	Predicted Electricity [kWh]	Electricity Saved (Predicted - Actual) [kWh]	CUSUM of Electricity Saved [kWh]	Known Production Issue
4/9/2017	91,499	-1,778	-1,778	0
4/16/2017	71,283	-2,873	-4,650	0
4/23/2017	88,598	-1,499	-6,149	0
4/30/2017	89,306	-5,556	-11,706	0
6/11/2017	89,244	7,983	26,229	0
6/18/2017	89,068	2,546	28,775	0
6/25/2017	86,897	-1,133	27,642	0
7/2/2017	87,237	-3,555	24,087	0
7/9/2017	65,565	-17,750	6,337	1
7/16/2017	81,958	-19,686	-13,349	1
7/23/2017	85,026	-16,824	-30,173	1
7/30/2017	87,630	-17,536	-47,709	1
8/6/2017	89,751	-2,176	-49,885	0
11/5/2017	86,984	1,307	-18,509	0
11/12/2017	90,789	-7,328	-25,837	0
11/19/2017	92,382	-2,915	-28,752	0
11/26/2017	55,562	4,861	-23,890	0
12/3/2017	85,959	-16,331	-40,222	1
12/10/2017	92,147	-15,187	-55,409	1
12/17/2017	98,765	-9,910	-65,319	0
12/24/2017	92,772	18,454	-46,865	0
2/11/2018	89,568	7,121	-33,993	0
2/18/2018	89,485	5,125	-28,869	0
2/25/2018	85,941	3,539	-25,330	0
3/4/2018	87,826	3,001	-22,329	0
3/11/2018	89,068	1,549	-20,780	0
3/18/2018	91,917	5,438	-15,343	0
3/25/2018	85,590	9,293	-6,050	0

Regression Statistics				
Multiple R	0.92617531			
R Square	0.857800705			
Adjusted R Square	0.755387738			
Standard Error	5072.140755			
Observations	52			
ANOVA				
	df	SS	MS	F
Regression	9	7138868488	7.93E+08	55.49792981
Residual	46	1183424144	25726612	
Total	55	8322292633		
	Coefficients	tandard Erro	t Stat	P-value
Intercept	(58,634.3)	21,052.9	-2.8	0.007745
Production Issue	21,570.8	2,398.6	9.0	0.000000
CDD-70	14,119.7	3,253.1	4.3	0.000077
Minor Hol (GF, Mem, 7-4)	1,922.6	3,831.2	0.5	0.618189
Square Root[Production [kWh]	115.8	18.9	6.1	0.000000

This approach is most useful for consistent long-term change or changes that occur randomly throughout the year. Often, this method is used to model disruptions or changes that could be considered as a variable (e.g., occasional shutdowns or weekend operation) but that did not occur in the pre period however, pre-period disruptions can be modeled using this method as well.

This project has a known production issue that arises throughout the year. The energy model tends to underestimate SEM savings when this production issue occurs, resulting in a large reduction in the final savings estimates. In order to account for this, the post data is modeled with an indicator variable to represent periods where the production change is active. In this case, the indicator coefficient is statistically significant and allows evaluators to account for the production effect and remove it from the final savings estimates.

# Engineering Models

Reduce the Compressed Air Pressure Setpoint			
Energy Costs (\$/kWh) =	0.0887	Input	
Compressor Type =	Reciprocating – On/off Control	Input	
Existing System Pressure (PSIG) =	140	Input	This calculation should only be used for compressed air systems operating in the range of 100 PSI
Pressure Reduction, $\Delta P$ (PSIG) =	35	Input	Pressure should only be lowered to 15% above the highest pressure demand user. A good practice is to lower the pressure in 1 psi increments until the target pressure is reached or until pressure issues arise.
System pressure after reduction (PSIG)	105		
Compressed Air System Operating Hours (hrs/Yr) =	8,760	Input	
Main operating compressor HP <sub>Real</sub> (Hp) =	10	Input	Do not include backup or redundant compressors
Capacity Factor =	5%	Input	Average operating capacity compared to full load
Adjusted compressor power, kW <sub>typical</sub> (kW) =	70.2		
Savings Factor =	0.005		
Nominal HP for typical compressor HP <sub>typical</sub> (Hp) =	100		Name plate HP
Energy Savings (kWh/yr) =	590		

Engineering models can be developed to represent savings from specific measures or equipment operation. These calculations should be driven by onsite collected data and, when possible, pre-post operation and trend data.

Often these models are created as a secondary approach to estimating savings and do not have the same rigor that is normally associated with other statistically-based approaches. The amount of information that is needed to justify these calculations can be burdensome but even simple calculations can be used with other methods to explain observed changes in energy usage.

This approach is useful to estimate savings that are not easily measured by the model or that occurs alongside other activities that may mask the impact of the measures. The impact of capital projects are often directly removed from the SEM savings using similar methods.